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STUDIES IN AIR AND CONTACT INFECTION AT THE PROVIDENCE CITY HOSPITAL

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The French were the first to suspect that air is of minor importance in the transmission of contagious disease and to modify hospital management accordingly. The most notable instance of the application of these views is at the Pasteur Hospital in Paris, which was opened in 1900. The management of this hospital assumes that air infection is of no importance in a cleanly hospital and that contact infection can be prevented by proper technique. The methods of the French have been imitated in a number of hospitals in England, and to a less extent in Germany, but have attracted little attention in the United States. Even to-day there are probably few who would not be shocked at the proposition of caring for cases of diphtheria, scarlet fever and measles in the same room and by the same attendants.

Without knowledge of what was being accomplished in France, the writer had long been convinced by other clinical facts, and also by the results of laboratory research, that the relative importance popularly attributed to air and contact infection should be reversed. A visit to Las Animas Hospital in this city, where Dr. Guiteras was boldly and successfully applying the new-found knowledge in regard to yellow fever, and where cases of that disease and of typhoid fever were treated in the same ward, confirmed the belief that a more definite knowledge of how other diseases are spread would lead to simpler and better methods of control. Later on, inspection of European hospitals where the new methods are practiced, convinced me that air infection in such hospitals is a negligible factor. Both the French and the English seem to have limited themselves merely to perfecting hospital management and have not cared to generalize from their experience. But the facts which have accumulated as a result of their work, taken together with the mass of evidence from other sources, justifies no other working hypothesis than this, that contact infection is by all odds the chief factor in the spread of the common contagious diseases. At all events when the hospital for these diseases was opened in Providence, it was frankly held by all concerned in its management that this was the only safe principle to guide our practice.

Read before the Municipal Health Officers' Section, American Public Health Association, Havana, Cuba, 1911.

There is nothing unusual about the construction of the hospital except perhaps that no effort is made to secure air isolation, if the term may be permitted, and every facility is afforded for the attendants to wash their hands. There are three two-story wards accommodating easily in all 150 patients. One building has been used exclusively for scarlet fever and complicating diseases. In another building the lower floor has been used for diphtheria and the upper floor for tuberculosis. The third and smaller ward, called the isolation ward, has 12 separate rooms on the lower floor opening into a common corridor, which it was hoped would accommodate most of the mixed and doubtful cases which are the chief problem of hospital management. The upper floor has larger rooms for groups of such cases. The other buildings also have an unusual number of rooms for one, two, three, or four patients. The purpose of this subdivision is by no means to secure air separation, and as a matter of fact the doors are all constantly open, but to provide for a separation of patients of different ages, sex, color, race and degree of illness. A large number of children, if it is determined with a fair degree of certainty that they all have the same disease, and particularly if they are convalescent, may be treated safely and more economically in a large ward. But adults, very sick patients, doubtful cases, and most cases are doubtful until some days after admission, and mixed cases, are better cared for in smaller rooms, though not necessarily always in single rooms. So far as air infection is concerned a case of mixed scarlet fever and diphtheria can be cared for perfectly well in a large ward full of scarlet fever patients, but it is difficult to prevent contact infection with other cases, and a busy nurse does not so readily remember that she must take unusual precautions with the mixed case, though she may be more or less successfully reminded of this by a red card, or a screen about the bed, or some other "barrier" as it is called, as is often done in English hospitals and not rarely in the Providence Hospital. But it is easier to guard against contact infection if such case of mixed infection is placed in a separate room, even if the door is left wide open.

One special feature which is considered of great importance is a lavatory for each of the rooms except the four large wards. The hot and cold water faucets of each are operated by eight inch levers moved by the elbow. There is no plug so that only running water can be used. Unless it is made easy to wash the hands they will not be washed. For other details of construction or furnishing reference may be had to the first report of the hospital, or to papers by the superintendent, Dr. Dennett L. Richardson.

In the large wards where all the patients are assumed to have the same disease and where they are mostly convalescent and out of bed playing with one another, the attendants make no special effort to avoid carrying infection from one to another, but the key-note of the management of all other cases is that the attendants shall by strict medical asepsis avoid self-infection and the transference of infection from one patient to another. I will be pardoned, I trust, if I now quote largely from a paper read by Dr. Richardson at the last meeting of the Association of Hospital Superintendents:

"The resident physicians have their quarters in the administration building and all eat in the same dining-room. While working in the wards, white duck suits are worn, and in each ward a gown is put on if it is necessary to examine patients, thus coming in direct contact with the bedding and patient. On leaving

the ward, the gown is removed in the gown and wash room, and the hands are carefully washed with soap and water in the special basin to which I have already referred. Great care is exercised when not having a gown on to avoid allowing any part of his clothing to touch the bed, bedding, or anything else.

"The nurses all sleep in the same home and eat in the same dining-room. When off duty, they are allowed to leave the hospital as freely as from any general hospital. When the nurse goes on duty, she goes to the dressing room for that ward where she has two metal lockers, one for clean clothes and one for infected clothing. She puts on her ward clothes and goes to the ward. She changes her dress, cap, apron, and bib only. When going off duty, she removes her infected clothing first, washes hands and face, and then puts on her uninfected uniform.

"The maids and other help put on gowns when entering the wards. These gowns have short sleeves so that the sleeves will not be contaminated. Otherwise they observe the same care as do the nurses. The ward help eat in the same dining-room and sleep in the same home as do all the other help, and they, too, are free to come and go when off duty. It is insisted that every case of illness among nurses and help be reported at once that no mild infection may be overlooked.

"The same kitchen furnishes food to patients and employees. Food supplies are sent to ward kitchens in paper bags and paper trays and these are destroyed. Such dishes as must pass between kitchens are boiled before leaving the ward and are washed again in the main kitchen."

The methods of handling the cases in the hospital, and the means taken to avoid contact infection can best be illustrated by the following description of the technique employed in our isolation ward, though substantially the same procedures are carried out when two or more cases of different diseases are treated in the same room, in other parts of the hospital. The isolation ward, it will be remembered, has single rooms only on the first floor, and rooms that vary in size on the second floor.

"We confine the infection to the rooms immediately occupied by patients. We expect that the corridors, serving kitchen, linen room, bath and toilet rooms are as safe and free from contagion as those of any general hospital. The same nurses care for the patients on a single floor. The nurse washes her hands with bar soap in the running water and dries them on an individual towel every time she touches the patient or anything in the room. If she comes in close contact with the patient she puts on a gown. Each patient is supplied with thermometer, urinal, basins, ice bag, heater, and so forth, everything necessary for constant use on the patient. All dishes and nursing apparatus coming from these patients are put directly into a sterilizer in the diet kitchen, if steam can be used, or 1-20 carbolic for rubber and glass goods. Bed pans and urinals are emptied into the hopper in the lavatory and are put into a tub of 1-20 carbolic where they are kept for an hour before removal to the warming rack.

"Small children who would play on the floor are kept in bed throughout their hospital residence. Larger children or adults are allowed up but confined to their rooms except when allowed out of doors, where they are also kept apart. The doors of the rooms stand open all the time, and this practice, together with the

extra corridor window, allows patients to see each other and to talk back and forth, and they seem to be very contented.

"When a patient is discharged, the linen in his room is sent to the laundry, the mattress and pillows to the steam sterilizer, and nursing articles are sterilized. The bed, wash basin, table, chair, floor, and walls within easy reach are simply washed with soap and water. Preferably the room is aired for twenty-four hours, but if we need it we have not hesitated to put a new patient into it immediately. Fumigation is never done.

"You will have noticed that we do not use any disinfectant solution for the hands. It has seemed to us that if we could make it convenient enough so that every time hands became infected they would be washed with soap and water, it would be sufficient. There is no antiseptic solution which is efficient under immersion if less than one minute. It is impracticable and impossible to get so long an immersion after washing, done by busy nurses, what is more important all the solutions injure the hands, setting up a dermatitis, which is a good soil for infection to linger upon. The results which I shall directly present,, seem to substantiate this practice.

Except during the first few weeks after the hospital was opened no prophylactic antitoxin has been administered to nurses, help, or to patients. Among the 128 nurses, graduates and pupils who have worked and are working in the wards, to September 1, 1911, the following diseases have developed:

Diphtheria, 3 cases.

Scarlet fever, 3 cases.

Rubella, 2 cases.

Mumps, 1 case.

One physician had diphtheria and a maid had scarlet fever, making a total of 12 among all attendants. 1,107 patients have been admitted to the hospital up to September first.

The following diseases have developed among patients in all wards save the isolation wards:

(1) One case of diphtheria in the scarlet fever ward.

(2) Five cases of measles in the scarlet fever ward, from some unknown sources.

(3) One case of rubella.

Since June 4, 1910, no further cross infections have developed among patients admitted and discharged from the diphtheria and scarlet fever wards, except the following: "A child with scarlet fever had been kept in the diphtheria ward for about a month without any extension of the disease, but finally a little diphtheria patient made its way into the room where the scarlet fever case was and came in contact with it and, as a result, developed scarlet fever. So, too, the case of the ward maid referred to above, was probably due to contact infection, as she was known to have eaten fruit which belonged to, and had been handled by a scarlet fever patient. The fact that these cases were almost certainly due to contact infection, suggests the probability that the other cross infections were also caused in the same way, though the exact means was not determined.

"I want to call your attention particularly to the results in the isolation ward, where we have not hesitated to place any disease in any stage, or cases for observation only. 345 patients have been admitted and discharged. Many of

these patients were suffering from more than one disease, so that the number of sources of infection was as follows:

	1911	1910	Total
Scarlet Fever	69	38	107
Diphtheria	29	18	47
Measles	18	38	56
Whooping Cough	25	29	54
Rubella	14	2	16
Chicken Pox	8	6	14
Mumps	4	5	9
Gonorrheal Vaginitis	..	7	7
Variola	1	..	1
Erysipelas	..	1	1
Acute Tuberculosis	1	..	1
Positive Diphtheia Cultures	31	21	52
Sources of Infection	200	165	365
Non-contagious Cases	23	25	48
Total	223	190	413

Of these 345 patients, 296 were in the wards more than one week and 49 less than one week.

The following diseases have been transmitted: One case of measles and one case of chicken pox. Following these for nine months, nothing developed. Within one week, in the latter part of January, 1911, four cases of scarlet fever developed and a fifth about three weeks later. Of these five cases the diagnosis of only two was definite. They were mild cases. The other three showed very little or no constitutional disturbance: one did not desquamate at all, and the other two desquamated a very little. We have, however, classed them all as scarlet fever. There has been no cross infection since February 23, 1911.

I want to add that during the larger part of the period reported on, much of the work has been done by pupil nurses who were sent to the isolation training for about two weeks only. We are planning, however, to have most of it done by a permanent staff.

It might be of interest to note that we have treated advanced cases of tuberculosis in the second story of the diphtheria building for 19 months and there has never been a case of diphtheria among them. The tuberculosis ward holds about 35 patients and there have been admitted in all 204."

Nurses and physicians have acquired infection as they have in similar institutions. The opportunities for infection are, however, greater in the Providence hospital than in most hospitals for individual attendants are not confined to the care of one disease. That some of our infection of attendants has been due to failure to take precautions against contact is certain. That most of it is due to spray infection while bending over the patient is highly probable. It is difficult to see how such infection can be entirely avoided without a constant wearing of masks.

Cross infection from patient to patient has also occurred, rather less, however, than in most institutions of the kind, although a greater variety of diseases

are admitted than is usual. As no effort is made to secure "air isolation," our experience indicates that infection by means of the air, outside of droplet infection, rarely if ever occurs where conditions of cleanliness prevail.

As nurses constantly pass freely from one disease to another, the theoretical opportunity for cross infection by contact is very great. The fact that such infection has rarely occurred shows that the means taken to prevent it are very effectual. The particular point of interest is that unnecessary frills, like caps, gowns under certain conditions, rubber shoes, gloves, disinfectants and fumigation, are omitted, and that emphais is laid on simple cleanliness. That cross infection has occurred seems most likely due to failure in technique, not to faulty principles of management. With pupil nurses such failures can hardly be entirely avoided. The wonderful success of the Pasteur Hospital I believe to be largely due to the employment of a permanent staff. Under the conditions of nursing which prevail in American hospitals and with the great variety of cases which the Providence hospital has been called upon to treat, great credit is due the superintendent and the head nurse for the excellent results attained.

Discussion.

DR. GUITERAS:

At Las Animas Hospital in Havana we have proof in support of the position taken by Dr. Chapin. We have separate rooms in the same building where at times scarlet fever, measles, diphtheria and varicella are treated. Doors and windows are always open. But we are very strict as to the change of gowns and constant washing of the hands. The nurse goes to the patient with the hands wet in bichloride solution, or, more frequently, well soaped. There is always a basin with bichloride solution in every room, and the soaped hands are immersed in bichloride on leaving, and then washed with soap outside the room. I think there are two advantages in approaching the patient with hands already soaped: the mind is kept on the wet hands, and subsequent washing is not forgotten; it is probable also that the infecting material is thus more readily washed off. We have no infections in the hospital. Our imported cases of smallpox we handle in the same way. In the case of smallpox the bed stands on sheets wet with bichloride solution. The nurses use slippers that are left at the door together with the gown. We commence very early the bathing of the patient with bichloride solution 1 to 4,000.

We quite frequently import severe cases of variola from Europe and Mexico, and there are no secondary cases. Everybody in the hospital is vaccinated whenever a case is admitted.

We are equally successful in the management of typhoid. Our wards are screened against mosquitos, and flies are, therefore, quite rare.

RECENT CONTRIBUTIONS TO OUR KNOWLEDGE CONCERNING INFANTILE PARALYSIS

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It is not the purpose of this paper to give a detailed account of the disease known as infantile paralysis or anterior polio-myelitis. Its scope will be restricted rather to a short discussion of the more important contributions which have been made to our knowledge of the disease during the past year. These contributions have not been, to be sure, of an epoch-making character, but they indicate distinct progress and emphasize certain lines of investigation as worthy of further attention.

Perhaps the most unusual finding was that of Henstaedter and Thro, who were able to produce what they considered typical polio-myelitis in monkeys by inoculation of these animals with emulsions of dust taken from the rooms of patients sick with the human disease. They were able, furthermore, apparently to transfer this experimental polio-myelitis to a second series of monkeys. Henstaedter and Thro believe, therefore, that infantile paralysis is propagated by dust and that the nasopharynx is the point of entry for the virus.

On the other hand, Rosenau, Shepard and Amosso and also Strauss have not been able to demonstrate any infectious power in the secretions of mouth and nose taken from polio-myelitis patients, even though the virus has been shown by Flexner, and also by Osgood and Lucas to persist for several months at least in the nasal mucous membranes of human beings and monkeys. The final estimation as to the value of Henstaedter and Thro's dust experiments must await confirmatory investigation.

The possible rôle of animals in the spread of infantile paralysis has always been of interest, for paralysis in animals and fowls of various species, such as the horse, cow, sheep, pig, dog, cat, hen, duck, etc., has been seen many times, occasionally in intimate association with human cases of paralysis. Proof continues to be lacking, however, that there is any etiological connection between the human and animal affections. Prof. Theobald Smith has inoculated monkeys intracerebrally with filtered emulsions of 12 such animal spinal cords, in every instance with negative results. A similar filtered emulsion from a human case proved positive.

Recent work of Flexner has shown that unfiltered material is much more dependable in these experiments, and it is possible that further inoculations with unfiltered emulsions of animal cords may give more positive information.

In this connection an interesting report is that of Römer, who has observed a spontaneous paralysis in guinea pigs, due to a virus which is filterable and in many ways resembles the virus of human anterior poliomyelitis.

That human anterior poliomyelitis can be transmitted to rabbits has been maintained for some time by Krauss and Meinicke, but most other observers have doubted this statement. In relation to this disputed point the results of Marks at the Rockefeller Institute are of especial interest.

Read before the American Public Health Association, Havana, Cuba, December, 1911.

Marks found that rabbits inoculated in the usual manner with polio-myelitis material became sick and died, and that the fatal affection could be transferred from rabbit to rabbit. The disease in rabbits, however, did not resemble human infantile paralysis either clinically or pathologically, but Marks was able to show that when the rabbit virus was reintroduced into monkeys it once more produced a typical paralysis.

The suggestion is, of course, that animals may be the unsuspected hosts of powerful viruses which unfold their paralytic characters only when introduced into human beings.

In this connection it is of interest to note that Massachusetts statistics for each of four consecutive years have shown that infantile paralysis is approximately 10 times as prevalent in the country as in the city. As would be expected, furthermore, country children have been shown by figures to be many times more subject to contact with animals of various kinds than city children.

The presence of animals means, necessarily, the presence of a host of biting flies and other insects, and an investigation by the State Board of Health of Massachusetts during the past summer showed in every one of 88 cases of infantile paralysis the presence near the house, on the house, within the house, and sometimes even in the sick room itself, of the ordinary biting stable fly, *stomoxys calcitrans*. This fly is, I understand, closely related to the tse-tse fly, already proved to be the carrier of disease. Whether stomoxys calcitrans can carry the infection of anterior polio-myelitis either directly or through some intermediate form developed within its body remains to be proved. Experiments looking towards that result are now in progress.

In harmony with such a theory of transfer would be the fact that anterior polio-myelitis has seemed to have an affinity for railroads and high roads. Many animals, healthy and diseased, together with their biting parasites, are passing constantly over the railroads, and high roads. Two patients in Massachusetts were young trainmen. Infective flies might, furthermore, follow horses or other animals, or even human beings, for long distances and cause secondary infection far from the original focus. In this way might be explained many apparently sporadic cases or even cases transferred apparently through the mediation of third persons. The true incidence of the disease coincides, moreover, with that for the greatest prevalence of insect life.

Hard to reconcile with such a theory, however, are the winter cases. Cannot their cases be explained by the assumption of a prolonged incubation period? Anterior polio-myelitis has many points of resemblance to rabies. May it not, like rabies, in certain instances, have an incubation period lasting weeks, or even months?

While it is true that an attack of polio-myelitis confers a large degree of immunity, it seems to be equally true that second attacks do occur. Thus such cases have been observed in Massachusetts, the interval varying from one to 16 years. In the period between attacks is it not possible that the affected individual becomes a carrier of the specific virus?

In one case we have noted the occurrence in the same individual of anterior polio-myelitis and herpes zoster. Have not these two affections the same pathological basis?

Strauss in a description of the pathology of anterior polio-myelitis states "the posterior root fibres and the arachnoid membrane covering the spinal ganglia are likewise infiltrated. This infiltration and that of the pia, together with the inflammation which is present in the spinal ganglia themselves are the factors which cause the irritative symptoms such as hyperæsthesia of various portions of the body, rigidity of the neck, the pain caused by movement of the joints, all of which are present in the early stages of the disease in its epidemic form." Strauss does not, however, mention herpes zoster as a possible complication of polio-myelitis.

It seems from the literature, however, that herpes zoster has for many years been classed with the eruptive fevers. It has seemed to be followd by a definite immunity. It has been known to occur in epidemics and these epidemics have favored the spring and summer months. It has seemed at times to be contagious, and it has been followed by paralysis of various muscles. The inference is strong that herpes zoster is due to the same virus as anterior polio-myelitis, but that it represents a different localization of the specific organism.

In one small, sharply localized focus in Massachusetts a case of zoster occurred in the summer of 1905. The polio-myelitis epidemic occurred in 1909. We know that anterior polio-myelitis occurs under many often atypical forms. It would certainly seem very possible that in herpes zoster we are dealing with one of these unusual types.

In an effort to institute specific treatment for anterior polio-myelitis Netter inoculated subdurally 4 patients with serum from recovered human cases. The donors of the serum used numbered 10 and had been sick anywhere from 2 months to 11 years previously. The amount inoculated was generally 7 c.c., with a maximum of 15 c.c. One patient received 9 inoculations, amounting to 103 c.c.

Four patients were treated in all. One died. Netter thinks the other 3 were improved by treatment.

It is thus painfully evident that we are still very ignorant concerning anterior polio-myelitis.

It is pleasing to reflect, however, that investigators of the first class are studying this disease all over the world, and that the quality of the work is such that the key to the problem may be discovered almost at any moment.

Discussion.

DR. SLEMONS:

In this discussion I would like to report a small epidemic which occurred in our city during the summer months. We had 9 cases, each occurring in large families. As the diagnoses in these cases were delayed and absolutely no attempt made at isolation, the exposures were necessarily very complete. In each family there were three or more separate exposures, and in no instance was there any evidence of secondary cases from the original 9 primary infections.

These cases occurred within a very short time, and it is our belief that they were in no way connected with each other. It was absolutely impossible to trace these cases to any source of possible infection.

DR. DOWLING:

Through investigation in North Louisiana we found nine cases occurred in one neighborhood and others in the same parish removed fifteen miles. Two

weeks later four cases developed in Shreveport, one hundred miles west, and a few days after this the disease appeared in Natchitoches, ninety miles south of Shreveport, from which place a loving mother with two sweet children fled to escape the ravages of this dreaded disease. Before she reached the border line, a little more than one hundred miles, both of the children showed positive evidences of the infection and both were paralyzed. These were chiefly sporadic cases, and there is but little doubt that the same conditions existed at different points to cause the disease.

While returning from California last summer I read in a Chicago paper of the anti-fly campaign in Kansas and was surprised and gratified to learn from this article that the infantile paralysis had disappeared in communities where the flies had been exterminated.

DR. ROBERTS:

In reference to the remarks of Dr. Richardson concerning the greater prevalence of the disease in rural districts than in cities, I might say that our outbreak in Hamilton, probably the first serious one in Canada, and comprising some one hundred cases, seemed to originate in three or four cases early in July or the latter part of June. Then we had a sudden outburst of some forty or fifty cases during the end of July and first two weeks of August, with a gradual decline until the month of November. The disease in our section certainly appeared to spread from city to country, as it was some considerable time definitely existant in the city before reports and inquiries began to come to me from the country and smaller towns, one or two some sixty miles away, about the strange new epidemic. Information that came to me from Ottawa and Guelph would seem to indicate the same.

In the early cases there were a couple of instances where the disease was traceable to contact with children in houses where the disease was—the well children coming down in a couple of weeks after being with the affected.

DR. GUITERAS:

The greater prevalence of the disease among the whites over the negro population, I think, would argue against the transmission by biting flies about the stables.

DR. RICHARDSON:

I hope I did not give the impression that I considered this theory to be absolutely proved. As to why the disease affects rural localities more than cities, we have no idea. It seems to be a fact, however, that in rural communities, the disease is approximately ten times as frequent as in the larger cities.

SANITARY INSPECTION OF THE CANAL ZONE

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The sanitary work of the Canal Zone, with the exception of the one settlement of Cristobal, is under the immediate jurisdiction of the Chief Sanitary Inspector.

This area comprises the following settlements:

		Inspectors.
1.	Balboa	1
2.	Ancon	1
3.	Corozal	1
4.	Miraflores	2
5.	Pedro Miguel	2
6.	Paraiso	1
7.	Culebra	2
8.	Empire	2
9.	Las Cascadas	1
10.	Bas Obispo	1
11.	Matachin	1
12.	Gorgona	1
13.	San Pablo	1
14.	Tabernilla	
15.	Mitchelville	1
16.	Gatun	4
17.	Porto Bello	1

In addition there are a number of native settlements adjacent to the settlements above enumerated. The total area over which the sanitary work is carried out approximates one hundred square miles.

For the purposes of sanitation each of the above-named settlements, with the adjacent native villages, is designated a Sanitary District, and is under the immediate charge of a District Sanitary Inspector, who has as many Assistant Inspectors as may be needed for the work of the District. There are seventeen Sanitary Districts in the Canal Zone. The Canal Zone is further divided into two halves, each half being designated a Sanitary Division, and placed under the supervision of a Division Inspector.

The personnel of the Division of Zone Sanitation is as follows:

1 Chief Sanitary Inspector.
1 Assistant Chief Sanitary Inspector.
2 Division Inspectors.
26 Inspectors.
1 Inspector-Entomologist.
18 Foremen and 226 Laborers.

The authority of the Chief Sanitary Inspector and his deputies is derived from the following provision of the Canal Zone laws:

Read before the American Public Health Association, Havana, Cuba, December, 1911.

Act. No. 8, Sect. 20. "The Chief Sanitary Inspector shall have direct charge, management and control of all work performed or entered upon within the Canal Zone for the prevention or suppression of diseases. He shall be charged with the duty of securing the enforcement of all sanitary regulations, and perform such other duties appertaining to his position as may be required of him by the Chief Sanitary Officer, the Governor of the Canal Zone, or the Isthmian Canal Commission."

In order that this work may be effectively and efficiently accomplished, authority to enter upon any premises is given by law to the Chief Sanitary Inspector and his deputies.

For the guidance of the Sanitary Inspectors, a book of instructions has been compiled. This book sets forth briefly the essential things necessary to the Sanitary Inspectors for the efficient performance of their work, such as methods of inspection, methods of making out the routine and special reports, building and screening regulations, construction of pit and pail closets, night soil disposal, fumigation, disinfection, etc. In addition, the Inspectors are required to be familiar with the appearance, life history and habits of anophelines, stegomyia and culicines. They are expected to be able to distinguish these species in their larval and adult forms, and to be familiar with the methods of mosquito eradication in use here. Inspectors are also expected to be familiar with the breeding habits of the house fly and the usual methods of extermination of flies.

From time to time suitable literature is supplied the Inspectors and bulletins embodying approved methods of procedure are issued.

What promises to be a very important factor in increasing the general efficiency and esprit-de-corps of the Inspectors are the recently inaugurated monthly conferences of Sanitary Inspectors, which all Inspectors are required to attend. At these conferences the theory and technical details of sanitary work are considered and improvements in technique suggested and discussed by the Inspectors, under the leadership of the Chief Sanitary Inspector, his Assistant, or an invited specialist.

I cannot leave the subject of personnel of the Division of Zone Sanitation without paying the Inspectors this tribute: Without the slightest fear of being accused of overdrawing the facts, I can say that a more enthusiastic, hard working, efficient and loyal body of men has seldom been organized into a sanitary corps.

WORK OF THE DIVISION OF CANAL ZONE SANITATION.

The work done by the Division of Canal Zone Sanitation may be classified in the order of its relative importance and magnitude into:

(a) Anti-malaria work.
(b) Anti-yellow fever work.
(c) Anti-plague work.
(d) Anti-typhoid and dysentery work.
(e) General sanitary work.

The work directed towards the control of malaria is relatively of most importance from the standpoint of the Sanitary Inspector, because it claims by far the largest portion of his time and effort—approximately two-thirds of the Sanitary Inspector's time being devoted to this work.

The anti-malarial work done by the Division of Canal Zone Sanitation may be classified thus:

A. Elimination of breeding places of the Anophelines.
   (1) By filling.
   (2) By drainage—sub-soil, surface.
   (3) By admitting sea water into fresh water areas.
   (4) By cleaning and training the banks of streams and of stagnant bodies of water.
   (5) By brush-clearing and grass-cutting.
   (6) By introducing fish into reservoirs, streams, lakes and other bodies of water where oiling and treating with "larvacide" would be impracticable.
   (7) By oiling, either by hand or by means of automatic drip devices.
   (8) By periodical application of larvacide.
   (The last three methods serve also to destroy whatever larvæ happen to be in the areas treated.)

B. Destruction of larvæ.
   (1) Oiling with crude oil.
   (2) Application of larvacide.
   (3) Introduction of fish.

C. Destruction of Adult Anophelines.
   (1) Catching and killing with the aid of a tube containing a cotton wad saturated with chloroform, or by means of the ordinary wire gauze slapper.
   (2) Catching in traps.
   (3) Fumigation.

ELIMINATION OF BREEDING PLACES.

This work is under the direct supervision of the Chief Sanitary Inspector, who personally decides on the best method to be adopted in each case. A great many factors bear upon this question, and the subject is so large and would require such detailed treatment, that a discussion of it, to be of any practical value, is entirely beyond the scope of this paper. I wish to say, however, that an experience of seven years has taught us the great wastefulness in cost and effort of the open-earth ditch under tropical conditions. We regard all open, unlined ditches as expensive and unsatisfactory makeshifts, to be tolerated only when the work is of a very temporary nature or as preliminary to the installation of sub-soil drainage or of properly lined ditches.

CLEARING AND TRAINING OF BANKS.

Pockets in the banks of streams and vegetation in the water near the banks are most favorable breeding places. We endeavor, therefore, to keep the banks free from pockets and to keep the streams and banks well above high water, free from all vegetation. The banks are trimmed and lined with stone wherever necessary and pockets are filled or cut away. Algæ are destroyed with copper sulphate or larvacide, or raked out, and vegetation cut and raked onto high ground, where it is burned whenever possible.

INTRODUCTION OF FISH.

This has been done in the Canal Zone with a considerable measure of success, in the streams and reservoirs from which our water supplies are derived.

The fish known as "Millions" in Barbadoes, a very small top-minnow of the species Girardinus, has been used for this purpose. Under the climatic conditions of the Zone, these fish multiply very rapidly and are productive of a great deal of good in destroying mosquito larvæ. Of course, streams stocked with these minnows cannot be treated with larvacide or copper sulphate. It must be remembered that the introduction of fish is not nearly as efficient as the use of larvacide, and is to be recommended only for bodies of water where the use of larvacide is impossible. In order that the fish may have ready access to the mosquito larvæ, it is necessary to keep the banks as free of vegetation as possible and periodically to rake out the debris from the water, and train the banks so as to avoid having small collections of water separated from the main body.

OILING.

We make use of the crude oil of the Pacific Coast, a rather heavy asphaltum-base oil. The method of application varies with the nature of the area treated.

FIGURE 1. OILING APPARATUS DEVISED BY INSPECTOR H. R. TRASK.

The pipe can be raised and lowered by means of a pedal.
Three rows of ⅛-inch holes are drilled in the outer thirty inches of the pipe.
The flow of oil is regulated by a hand valve placed near the driver's seat.

In streams of a moderate rate of flow, such as natural streams and earth ditches of a low velocity, the oil is usually applied by means of some automatic drip device. A number of such devices are now in use in the Zone, and each has its advocates, its advantages and disadvantages, the simplest and most efficient being the ordinary commercial galvanized iron ash can of about thirty gallons capacity, into the side of which, about three inches from the bottom, an opening about two inches wide and ⅜ of an inch in height is made. Into this opening is soldered a flat spout 1¾ inches wide, ¼ inch high, 2½ inches long, into which is inserted an ordinary wick. Three or four lengths of the wick commonly used in alcohol lamps, laid side by side, are very satisfactory. The rate of flow is regulated by compressing the spout until the oil drips with sufficient rapidity to give a good oil film.

The heavy oil used by us has a tendency to clog the wick. The clogging is, to a certain extent, prevented by putting into the bottom of the can sufficient water to reach within an inch or so of the wick. This water acts as a settling basin for impurities heavier than the oil. In addition, it is often necessary to "cut" the oil by the addition of from five to ten per cent. of the larvacide.

In order to be efficient, the drip-can must be placed two or three feet above the surface of the water to which the drip is to be applied, so that the drops may strike the surface of the water with sufficient force to be broken up.

The drip-cans described above, as well as the several other devices for the automatic application of oil, require constant watching to insure satisfactory action. It is our custom to inspect each can twice a week. One laborer in each district is usually assigned to the duty of adjusting and refilling these cans, and the Sanitary Inspector is expected to inspect them at least once a week.

In addition to automatic drip oiling, the streams on which drip cans are installed are treated with "larvacide" along the banks, whenever larvæ are found.

Bodies of stagnant water are oiled by the periodical application of a rather thick layer of oil, such oiling being repeated whenever the layer of oil is broken by rains, floods, action of the wind, etc.

FIGURE 2. METHOD OF BURNING GRASS ALONG DITCHES.

The photograph shows the barrel, the pump and the operator starting the burning of a ditch. Note that the burning is started at the windward end of the ditch.

Whenever the prevailing winds are of considerable velocity and blow fairly steadily from approximately the same point of the compass, the oil layer on pools of considerable size shifts to leeward, exposing a more or less extensive surface of water. To prevent this shifting of the oil layer, we make use of timbers, planks, etc., anchored at intervals along the windward portion of the pool. Such floats tend to keep the oil layer from shifting.

Earth ditches, small pools, etc., are usually oiled from an ordinary garden sprinkling can once a week.

Recently we have introduced the use of a horse drawn sprinkling cart, for oiling ditches situated near roads, and wherever such a cart can be drawn without the ground being cut up by the wheels and hoofs. This method of oiling is very much more economical than hand oiling. We owe this device to Inspector H. R. Trask. (See Fig. 1.) It has been found that repeated application of a heavy coat of the asphaltum-base crude oil to the bottom and sides of earth ditches, especially if this application is preceded by burning the vegetation, tends to retard the growth of grass and serves to considerably increase the stability of earth ditches. This fact is extensively made use of in our work. For burning such vegetation we have been using a home made apparatus, burning crude oil, it being essential that any apparatus we used should be portable, i. e., capable of being carried by not more than four men. We have not been able to find on the market a portable apparatus that would burn crude oil efficiently, for the reason that any apparatus for burning such oil must include an air compressor of considerable capacity. We have found, however, that if a fire is started and a fine spray of crude oil is projected into it, the grass will be consumed in a fairly satisfactory manner.

The following is the usual method of grass-burning used here:

A small barrel fitted with a Myers Barrel Pump is filled with a mixture of ninety parts of crude oil and ten parts of larvacide. To the pump is attached a fifty foot length of one-half inch hose, terminating in a six foot half-inch iron pipe with a spray nozzle on the end. The fire is started on the windward end of the ditch and the spray of the oil and larvacide mixture is directed into it. As the fire spreads, the spray is advanced to leeward. Three men with an apparatus of this nature will burn about six hundred running feet of ordinary earth ditch in eight hours, at a cost of about two cents per running foot. (See Fig. 2.)

The secret of successful oiling is a continuous oil film. It is surprising how readily mosquito larvæ will find a small fault in a large oil surface. Vegetation protruding through the oil layer will destroy its continuity unless the oil layer is very thick indeed.

A simple method of obtaining automatically a thin oil layer on flowing streams of low velocity is occasionally made use of. A bundle of cotton waste, such as is used for wiping machinery, is soaked in crude oil and dropped into a stream with a stone attached to keep it from floating down. This bundle of waste slowly casts off the oil, and a very satisfactory oil layer results.

On large bodies of water, with many stumps, trees, etc., projecting through the water, it is often necessary to make use of a boat for the oiling.

We use about 65,000 gallons of crude oil per month, at a cost of $1.10 per 42 gallon barrel.

LARVACIDE.

The larvacide we use is manufactured by this Division. It is made by adding to 150 gallons of crude carbolic acid, which must contain not less than 15 per cent. of phenols, 200 pounds of well pulverized resin. This mixture is heated at a temperature of 212 deg. F., until a perfectly uniform, thick, dark brown liquid containing no particles of undissolved resin is formed. Thirty pounds of sodium hydroxide, dissolved in about six gallons of water, are then added to the mixture and the heat maintained at 212 deg. until a sample of the mixture readily emulsifies with water. From the time the resin is added and until the mixture is ready to be drained off, continuous stirring must be kept up.

This larvacide, when properly made, will kill mosquito larvæ in a 1 to 1,000 emulsion in water, from one to five minutes. It will kill larvæ in one-half hour in a 1 to 5,000 emulsion. The larvacide is also an effective bacteriocide, having a somewhat greater efficiency than phenol.

It has, however, the following defects: (1) It loses its larvacidal properties when exposed to the air for more than an hour. (2) It is ineffective in sea water and brackish water.

We use larvacide extensively (about 13,000 gallons per month) in treating small collections of water, as, for instance, in machinery, castings, etc., in treating pockets in streams and slow flowing ditches where vegetation and algæ are abundant, and wherever rapid larvacidal action is desired. We also use it in three per cent. emulsion for the disinfection and deodorizing of pit closets, night soil pails, garbage cans, etc. It is also used in ten per cent. emulsion in the destruction of fly larvæ.

The method of use for treating water collections is to apply a sufficient quantity of a ten per cent. emulsion of the larvacide in water, to obtain a 1 to 1,000 to 1 to 5,000 emulsion in the collection of water so treated. For this purpose we usually employ the Myers Knapsack Sprayers. The tanks of these sprayers hold five gallons, and the pump is sufficiently powerful to project a good spray for a distance of six feet from the nozzle. The effect of larvacide being transitory, it is necessary to apply it at sufficiently close intervals to prevent pupation of the larvæ. Conditions in Panama require a weekly application.

DESTRUCTION OF ADULT MOSQUITOES.

This work has met with a measure of success far exceeding the expectations of the most sanguine. The two methods generally used in destroying adults are: catching by hand and catching in traps.

In hand catching we make use of a glass tube about five inches long and one inch in diameter, into the bottom of which is packed a small wad of cotton saturated with chloroform. This tube is kept corked except when in use. When it is desired to kill a mosquito the tube is carefully placed over the insect while it is at rest on some solid object, and if the cotton is well saturated with chloroform, the mosquito instantly perishes and drops into the tube. At the end of the work the mosquitoes are removed from the tube, the species identified, and a record made of the number of each species caught. Ordinary "slappers," a piece of wire gauze fastened to a short handle, are also used.

A trap, specially designed by Inspector C. H. Bath, has been used with success. In localities where there is a considerable flight of mosquitoes, such as Corozal and Miraflores, we have been able to catch thrice the number of mosquitoes in traps than we were able to catch by hand with the most careful daily work. This trap has also been successfully used for fly catching.

The traps are installed in two ways: Either to catch the mosquitoes when they endeavor to enter the building, or to catch them when they attempt to leave the building. We usually combine both methods by installing several traps in each building. The traps intended to catch mosquitoes attempting to enter the building are nearly always installed on the lee side of the latter. Experience has demonstrated beyond a doubt that trap catching is much less successful on the windward side.

By careful hand catching we have been able to control malaria infection so well that in certain construction camps along the line of the relocated P. R. R. the malarial rate has been practically as low as the average rate in our settlements where extensive sanitary work is being done, despite the fact that practically no larvæ destruction or breeding-place eradication has been carried out in the vicinity of these construction camps.

As this paper deals only with the Sanitary Inspectors work in the Canal Zone, I will not discuss the method of malaria prevention by the prophylactic use of quinine.

ANTI-YELLOW FEVER WORK.

Despite the fact that no case of yellow fever originated on the Canal Zone since May, 1906, not one iota of our efforts to eradicate stegomyia has been abated. The Sanitary Inspectors exercise great vigilance in preventing accumulations of water in containers where stegomyia might breed.

The following methods are adopted:

Roof gutters are not allowed, except self-draining, short gutters over entrance.

No water containers are permitted at any house within a 300 foot radius of a public water supply, nor, of course, at any house where there are water connections. In localities more than 300 feet distant from a public water supply, only screened containers are allowed. The Sanitary Department supplies the material for screening one container at each house.

The method of screening barrels is as follows: The top of the barrel is covered with sixteen mesh copper wire. In the center of this is laid a piece of ¼ inch mesh galvanized iron screening a foot square, and on top of this a wooden cover with a hole in its center six or eight inches square. The cover is fastened down with nails and the barrel fitted with a spigot.

The stegomyia eradication measures on the Canal Zone have been so successful that an adult stegomyia is considered a great curiosity, and it is becoming difficult to obtain stegomyia larvæ in the sanitated area of the Canal Zone.

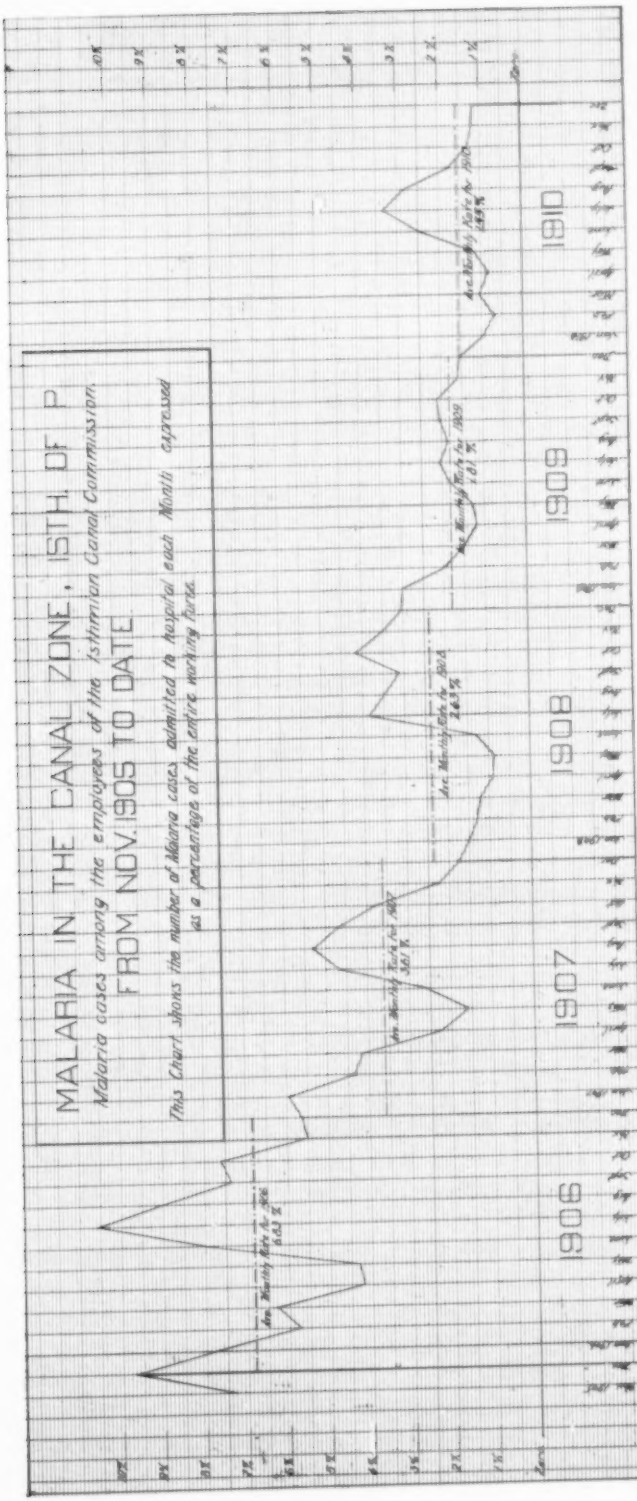
ANTI-PLAGUE WORK.

Within four days travel from Balboa, the Pacific port of entry to the Canal Zone, is situated the City of Guayaquil, where plague is endemic. In addition to the very rigorous enforcement of the quarantine laws, a campaign of rat destruction is continuously carried on by the Division of Zone Sanitation, especially in the settlement of Balboa.

We make use of various traps and poisons. The larger types of cage traps have been the most successful in our hands; and of poisons, a phosphorus paste has given best results. The use of biological products has not met with any success in our work.

All rats caught or found dead are immediately immersed in a three per cent. solution of larvacide, carefully wrapped in a cloth saturated with the same solution, placed in a proper receptacle and sent to the laboratory of the Board of Health.

In the course of the work of rat destruction we have found that rats will soon learn to avoid the trap, if one type is used continuously. The same may be said of poisoned bait. We find it necessary to frequently change the type of traps and the character of the poisons and baits. All traps are carefully scrubbed after


MALARIA IN THE CANAL ZONE, ISTH. OF P
Malaria cases among the employees of the Isthmian Canal Commission
FROM NOV. 1905 TO DATE
This Chart shows the number of Malaria cases admitted to hospital each Month expressed as a percentage of the entire working force.
1906
1907
1908
1909
1910

each catch. This is necessary because rats will avoid a trap in which a catch has been made recently, unless the trap has been carefully cleansed.

One of the earliest measures adopted by the Sanitary Department of the Canal Zone has been the promulgation of a regulation requiring that all dwellings be either elevated not less than three feet above the ground or have concrete floors laid directly upon the ground. This measure operates both in the prevention of ingress of rats into the dwelling and in aiding inspection for collections of water under the houses, which would be very difficult to detect were houses permitted to be erected with less than a three foot clearance between the ground and the floor.

ANTI-TYPHOID AND ANTI-DYSENTERY WORK.

Our reservoirs and their watersheds are kept free from human habitation and trespass, and the water periodically examined chemically and bacteriologically.

In the matter of prevention of fly breeding, the Sanitary Inspectors are required to see to the disinfection of all garbage cans and their thorough daily cleaning. The garbage is either incinerated or buried each day. Stable manure is either incinerated, buried or dumped at a suitable distance from human habitation.

Various methods of fly larvæ destruction in manure piles have been tried, but so far no practicable method of treating manure chemically has been evolved. Incineration we consider the best method of manure disposal. For this purpose we make use of a railroad-iron grate with a rough shed over it. With the addition of a little wood or crude oil, a comparatively small grate area will take care of a surprisingly large quantity of manure. A grate 6 x 4 feet will easily dispose of two wagon loads of manure a day.

Pit closets are required to be fly-proof, and in addition are treated with crude oil at frequent intervals, at least once in ten days.

Bulletins for free distribution among the people have been issued by the Sanitary Department inviting attention to the danger of flies and to their habits, with the idea of interesting the people in the prevention of fly-breeding and the destruction of adult flies.

GENERAL SANITATION.

In connection with the work of general sanitation, the Division of Zone Sanitation has under its jurisdiction grass cutting, screening and fumigation.

In the climate of Panama, especially during the rainy season, grass grows with astonishing rapidity. Actual measurements of a species of grass we commonly encounter here showed a growth of thirty-two inches in four weeks. Tall grass and bush furnishes shelter to adult mosquitoes and tends to hide breeding places; it also prevents evaporation from small puddles formed by rain and seepage and hides from view water-containers that may be carelessly thrown into the grass.

All grass is kept trimmed low within, and adjacent to, settlements. In addition, the grass is cut low along the banks of streams, in swampy areas and places in which water might collect through seepage or rain anywhere within probable mosquito-flight distance of a settlement. The total amount of grass cut per annum approximates 20,000,000 square yards (4,000 acres).

Wherever possible grass is cut with a horse mower, but the bulk of the work must be done with scythes, because in a great many areas where grass is cut for sanitary reasons, the ground is too boggy to admit a horse-drawn machine without

danger of horse and machine forming breeding places in the imprints made by the hoofs and wheels.

The Commission buildings used as dwellings, offices and schools for white children are thoroughly screened. It is the duty of the Sanitary Inspectors to see that the screening is adequate and kept in good repair.

In addition to screening inspection, the Sanitary Inspector must look for the thousand and one little defects inherent to frame buildings which would permit the ingress of mosquitoes. In the damp climate of Panama the light wood construction used warps very readily, and a constant watch must be kept to detect and speedily remedy defects.

FUMIGATION AND DISINFECTION.

Sanitary Inspectors carry out all the fumigation and disinfection necessary.

It is the rule here to fumigate only in diseases in the transmission of which insects are concerned.

In bacterial diseases, such as diphtheria and typhoid fever, thorough disinfection of utensils, floors clothing and bed clothes only is carried out.

In fumigation for the destruction of insects and rats we use sulphur in the proportion of five pounds to one thousand feet of air space, with an exposure of from two to four hours.

BUILDING INSPECTION.

The Division of Zone Sanitation is charged with the duty of approving all permits for building and building sites, as well as with the duty of enforcing existing building regulations.

All building permits, with plans and specifications, are taken to the Sanitary Inspector for his approval, and it is the duty of the Sanitary Inspector to see that no building is erected without a permit, or not in accordance with the plans and specifications submitted.

Among the lesser duties of the Sanitary Inspectors are the inspection of restaurants, stores, shops and dwellings for general cleanliness, the inspection of pit closets, manure piles, garbage dumps, etc.

It is also the duty of the Sanitary Inspector to establish and maintain house quarantine whenever this is ordered by the Chief Sanitary Officer, and to direct the impounding, or to personally impound, animals pasturing in areas where their presence may result in a sanitary nuisance.

It would be perfectly pertinent to ask this question: What results have been obtained by the expenditure of all this work and money?

In reply to this question I beg to submit the following.

The sanitary work on the Canal Zone has a three-fold value:

(1) It would have been quite impossible to retain an efficient organization on the Canal work were the sanitary conditions permitted to remain as they were found to be in 1904. The high mortality of yellow fever and plague, as well as the frightful morbidity of malaria, if left unchecked, would soon disperse the force at work on the canal and would deter others from coming here. Indeed, it is not unreasonable to suppose that the Nation would not countenance the prosecution of the work at such cost of life as would undoubtedly result were sanitary measures not carried on in an efficient manner.

(2) Sanitation pays from the economic standpoint, both in preventing loss through absence from work because of illness, and in increasing the efficiency of the force through the prevention of its being honeycombed by a large number of sickly, anemic, and therefore inefficient workers suffering from chronic malaria.

In this connection I wish to invite attention to the following figures:

In 1906, when anti-malaria work was just beginning to be effective, the malaria sick rate (i. e., the number of malaria cases admitted to the hospital per 100 of employees) was an average of 6.83 per cent. per month for the employees. Estimated upon the basis of the present average number, we should have 3,237 employees constantly sick with malaria per month.

The malaria sick rate for 1910 was 1.55 per cent. among employees, which would give 734 cases constantly sick from malaria per month, a decrease of 2,503 cases per month as compared with the rate of 1906. Estimating the average period of illness in malaria at five days, 150,163 days have been gained in 1910. Placing the loss to the Government, in loss of labor and cost of treatment, at $3 per day per man, $450,491 have been saved to the Nation in 1910 on the single item of the malaria sick rate. (See chart.)

Incidentally there were 233 deaths from malaria among employees in 1906 and only 50 in 1910.

The Division of Zone Sanitation expended $501,497 in 1910. Deducting from this the $450,491 saved through the reduction of the malaria sick rate, $51,006 are left to account for as the debit to all the other work of the Division of Zone Sanitation: anti-yellow fever work, anti-plague work, anti-typhoid and general sanitary work, such as garbage collection, grass cutting not essential for sanitary reasons, closet disinfection, etc., *scattered over 100 square miles.*

In addition, the Division of Zone Sanitation should be credited with the immense increase in efficiency of a force practically free from malaria over a force in which every other man is ailing and unable to do a real day's work, as is the case where there are a great many people suffering from the effects of repeated attacks of malaria. As is well known, a person subjected to repeated attacks of malaria of a moderate severity, ultimately reaches a point where the malarial infection manifests itself as a cachexia, when the patient is quite able to remain at work, but with his efficiency seriously impaired.

(3) Sanitary work on the Canal Zone served to bring to the attention of the world the possibility of making the tropics habitable for Caucasians, and that the cost of bringing this about need not be prohibitive.

As Col. W. C. Gorgas, Chief Sanitary Officer of the Isthmian Canal Commission, in his address on June 11, 1910, before the American Society of Tropical Medicine, pointed out:

"The medical and hospital care of our employees and their families has cost us two and one-half cents per day per capita (*of population*) and their sanitation nine mills per day. These figures are well within the financial ability of any tropical country."

I am indebted to Col. W. C. Gorgas, Chief Sanitary Officer of the Isthmian Canal Commission, for permission to contribute this paper, and to Mr. J. A. LePrince, Chief Sanitary Inspector of the Canal Zone, for his many valuable suggestions, embodied in this contribution.

THE USE OF ANTITYPHOID VACCINE IN PUBLIC INSTITUTIONS AND AMONG CIVILIANS

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and
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So much has been written on the prophylactic inoculation against typhoid fever in the last few years that it seems almost like an act of supererogation to make a further report on this same subject. However, this work has been largely limited to military life, and as our inoculations have been given to inmates of institutions and to civilians, we feel that this is sufficient apology for adding to the literature upon the subject. Again, it is more with the hope of stimulating others to use antityphoid vaccine in private life than with the intention of proving the efficacy of this method of reducing the attack rate from typhoid fever, that we present our results. Indeed, no further proof of the efficiency of vaccination against enteric fever need be adduced than citing the brilliant results obtained at the encampment of the Maneuver Division at San Antonio, Texas.

Nelson and Hall[1] state that of approximately 12,000 men at this camp only two became infected with typhoid fever. Of these one was a teamster who had never been inoculated, the other a private of the hospital corps who had received two doses of the vaccine. These writers are of the opinion that with these cases of typhoid and with typhoid carriers present in the command, an epidemic of enteric fever could not have been prevented had the troops not been immunized.

We were led to take up this work by the report of Major Russell in the Johns Hopkins Hospital Bulletin for March, 1910, and by a knowledge of the excessive attack rate from typhoid fever among physicians, nurses and attendants in hospitals. Thus Joslin and Overlander[2] found that in the years 1902-1906 inclusive the morbidity rate for the nurses in six Boston hospitals was 161 per 10,000, as compared with 20 per 10,000, which was the approximate attack rate for the whole population of Massachusetts. These writers conclude that "the hospital nurse in Massachusetts is about eight times as liable to contract typhoid fever as the ordinary citizen." At the time this paper was presented our statistics from the local hospitals were very incomplete and showed at that time an attack rate of 1.4 per cent. or of 140 per 10,000 among nurses and hospital attendants. Since then more nearly complete figures show the morbidity rate for the five years preceding the inoculations to average about 500 per 10,000 among nurses. Since in the city at large the attack rate has ranged from 24.5 to 42.2 per 10,000,* in these hospitals the nurses and attendants appear to be from about 12 to 20 times more likely to become infected than the citizens of Baltimore.

Read at the Annual Meeting of the American Public Health Association, Havana, Cuba, December, 1911.

* As the report of typhoid cases in Baltimore is not complete these figures are estimated from the reported deaths on a basis of a 10 per cent. fatality.

[1]Nelson and Hall. Jour. A. M. A., LVII., 29, 1759.

[2]Joslin and Overlander. Boston Med. & Surg. Jour., CLVII., p. 247.

Our first inoculations were made in March, 1910, at which time we vaccinated volunteers from the laboratory force of the State and city boards of health, including ourselves. Immediately following this, through the kind efforts of Dr. Wm. Royal Stokes and Dr. Pearce Kintzing, we were enabled to immunize the resident staff and nurses of the Mercy Hospital and of the Franklin Square Hospital. Altogether ninety-nine inoculations were made in 1910; these were given to 68 of the nurses, resident staff and attendants at the Mercy Hospital, 16 of those at the Franklin Square Hospital, 13 of the laboratory force of the city and State departments of health, and 2 medical students. This year (1911) through the courtesy of various physicians we have been allowed to introduce this prophylactic method into a number of hospitals in the city and State, so that up to the present time between 1,600 and 1,800 individuals have been inoculated with the vaccine prepared by us.

We have been able to secure records of the effects of the vaccine in 1,575 cases; we ourselves inoculated 71 of these, this number embracing the Health Department laboratory force and volunteers from the College of Physicians and Surgeons and the medical school of the University of Maryland. Thirty-two were private patients of numerous physicians, while the total number was distributed as follows:

Springfield State Hospital, inoculated under the direction of Dr. J. Clement Clark	887
Spring Grove Hospital, inoculated under the direction of Dr. J. Percy Wade	330
Mercy Hospital, inoculated under the direction of Dr. Eckhart	68
University Hospital, inoculated under the direction of Dr. Howard J. Maldeis	88
St. Joseph's Hospital, inoculated under the direction of Dr. Eugene Hayward	34
Homeopathic Hospital, inoculated under the direction of Dr. H. M. Stevenson	11
Franklin Square Hospital, inoculated under the direction of Dr. Pearce Kintzing	16
St. Agnes Hospital, inoculated under the direction of Dr. J. A. Chatard	38
Private cases, inoculated under the direction of numerous physicians	32
Physicians, students, laboratory force, etc., inoculated by the writers	71
	1575

Before proceeding with an analysis of the reports we have received from these institutions we shall briefly describe the preparation of the vaccines we employed. In the year of 1910 we made our vaccine from six strains of the typhoid bacillus, five of which were obtained from recent blood cultures. The sixth organism was one that had been in the laboratory for several years. A mixed culture of these bacilli was made in bouillon and was incubated for 24 hours and this was inoculated on agar. Twenty-four-hour-old cultures were washed off with sterile salt solution and the organisms were killed by heating at 58° C. for forty-five minutes. The vaccine was preserved by the addition of 0.25 per cent. trikresol. In 1911 our vaccine was made from a single strain of the typhoid bacillus furnished us through the courtesy of Major Russell, this

being the same organism with which the army has been inoculated. The preparation of this vaccine was similar to that previously described except that the organism was killed by adding 0.5 per cent. of carbolic acid. Our vaccines were standardized by Wright's method and by the modification of Wright's method first described by Harrison. Aerobic and anærobic cultures were made and animals were always inoculated before any of the vaccine was distributed.

The method of preparing the arm for the administration of the vaccine has varied at different times. At Springfield Hospital and Spring Grove Hospital the arm was thoroughly cleaned and tincture of iodine was applied before and after the inoculation. Previous to this we had always advised the thorough cleansing of the arm and the application of carbolic acid or bichloride of mercury solution before the injection. In our own cases the arm was rubbed briskly with 95 per cent. alcohol.

The doses employed have varied somewhat, but in our earlier cases we administered 125,000,000, 250,000,000 and 500,000,000 dead typhoid bacilli at intervals of 7 to 10 days. In 184 of our later cases doses of 250,000,000, 500,000,000 and 1,000,000,000 were used.

Of the inoculated 264 were between 20 and 30 years of age, 938 were between 30 and 40 years old, 2 were between 50 and 60 years, while the age of the remaining cases was not determined.

Proceeding now to an analysis of the reports we find that local tenderness and redness were present in every case, but needle abscess or infection never supervened. Other reactions caused by the injections were general malaise in 733 cases; headache in 739 cases; muscular pains in 79 cases; nausea and vomiting in 38; chills in 15 and fever in 804 cases. Systemic symptoms were absent in 771 or nearly 49 per cent. of the cases.

As previously stated there was no fever following the injections in 771, or 48.9 per cent. of the inoculated. In 737, or 46.7 per cent. of the cases the temperature was 101° F. or under; in 52 or 3.3 per cent. it ranged from 101° F. to 103° F.; in the remaining 15 or 0.9 per cent. the temperature was 103° F. or over. Thus 95.6 per cent. of those immunized had either slight reaction or none at all; 0.9 per cent. had severe and 3.3 per cent. moderately severe general disturbances.

The rise in temperature followed the first inoculation in 166 cases; the second inoculation in 288; the third inoculation in 391; the first and second in 37; the second and third in 9; the first and third inoculation in 6, and the first, second and third inoculations in 3 cases.

In those who had systemic symptoms, the latter disappeared in from 1-6 hours in seven cases. In 85 cases the symptoms persisted from 6-12 hours; in 89 they lasted from 12-24 hours; in 43 cases, from 24-48 hours; in 5 cases, from 47-72 hours; in 6 instances, from 72-96 hours; in one person for 5 days, and in two women over 10 days. One of the latter was a patient suffering from chronic mania at the Springfield Hospital. In this instance a low grade of temperature persisted for two weeks and tuberculosis was suspected; and while no sputum could be obtained for examination for the tubercle bacillus, the patient had a hacking cough and dullness over a portion of one lung. The other was a very hysterical woman and suffered from gastric distress for 10

days following inoculation. She, however, has had similar attacks both before and since that time. She also suffered from chronic constipation. In another institution two tuberculous persons were inoculated; one of these reacted with moderate severity, and the other but very slightly to the vaccines.

The polyvalent vaccine was used to inoculate 99 and that made from the Russell strain in injecting the remaining 1,476 people. The reactions produced by the different vaccines were as follows:

	Polyvalent Vaccine		Vaccine from Single Avirulent Strain	
Reaction	Number	Percentage	Number	Percentage
No reaction.....	56	56.0%	715	48.4%
Slight (Temperature normal—101° F.)	24	24.0%	713	48.3%
Moderately severe (Temperature 101°-103° F.)...	16	16.0%	36	2.4%
Severe (Temperature over 103° F.)	3	3.0%	12	0.8%

The above table shows that the polyvalent vaccine was more often followed by no reaction than was the other type. On the other hand 96.7% of the cases receiving doses of the single avirulent strain had either no fever or a temperature less than 101° F., while only 80% of the other cases showed the same result; moderately severe and severe reactions, therefore, more frequently ensued after the administration of the polyvalent type.

It is too early to draw any conclusions as to the result of these inoculations in the prevention of typhoid fever among the classes of individuals vaccinated. However, none of the people inoculated in 1910 and 1911 have as yet developed typhoid fever. Of peculiar interest is the fact that, at one of the hospitals, a nurse who was out of the city at the time the inoculations were made developed typhoid fever. At another hospital a nurse who was on her vacation at the time the others were immunized also developed enteric fever. At a third, where the nurses were inoculated in 1910, two out of eight who were not immunized contracted typhoid fever in 1911. At Springfield Hospital 887 out of a total number of 1,220 employees and patients were vaccinated. The attack rate from typhoid fever at this institution for the past five years has been approximately 1% a year, or about 12 cases each year among the inmates of the hospital. During the past summer only three cases occurred and these were among the 333 individuals who had not received the vaccine.

In conclusion we believe that the vaccine is of undoubted value in the protection against typhoid fever, and owing to the undue incidence of this disease on hospital nurses and attendants its use among these classes is urgently recommended. Also in hospitals for the insane and mentally deficient inoculation can be employed in reducing the number of cases of this disease. In such institutions, however, great care should be exercised in the selection of cases for inoculation, since we have very little knowledge concerning the effect of the vaccine

on persons of advanced years or on those suffering from such chronic organic disturbances as arterio-sclerosis and cardiac and renal diseases.

Also the general adoption of this preventive measure in private life would undoubtedly produce a lowering of the barbarious typhoid attack rate. For this measure to be popularized the discomfort following the vaccinations must be as slight as possible. It would therefore seem that concerted efforts should be made to determine the minimum dose that will give the maximum protection.

This problem is one of great complexity. On the one hand individuals vary greatly in their susceptibility to the typhoid endotoxin, as is clearly shown by the diversity in the reactions to equal quantities of the same vaccine administered under similar conditions. On the other hand, of a number of persons on whom we studied the amount of bacteriotropic substances produced, we found great variations in their concentration in the blood. Similar differences are also noticed when rabbits of the same weight are inoculated with equal quantities of the identical stock of vaccine. Again, to what extent the concentration of these bodies in the blood-serum is an indication of the degree of protection is also unknown. It is known that there is at first a rapid decrease in their amount followed by a very slow decrement to the normal quantity. There is also no correspondence between the severity of the reactions and the amounts of bacteriolysin, opsonin and agglutinin produced.

All things considered, however, we believe that it is unwise, except in the case of very vigorous people such as the regular troops, to give an initial dose of more than 250,000,000 dead typhoid bacilli, doubling the amount at each of the succeeding inoculations. In the highly neurotic and in children the first dose should be even smaller than this. In children the dose should be based on the body weight, using 150 pounds as the standard. In the administration of anti-typhoid vaccine to the general public it may be found better to start with an initial inoculation of 125,000,000 and give three other doses of 250,000,000, 500,000,000, and 1,000,000,000 each at intervals of 7-10 days; for if such a method would materially lessen the discomfort of the immunization a larger number of persons would submit to vaccination against enteric fever. This is a condition greatly to be desired, for with every individual directly protected there will ensue a greater proportionate protection of the community at large.

We wish to extend to the physicians under whose care the inoculations were made our sincere thanks for their kindness in allowing the use of the vaccines in their respective institutions and for furnishing us with the records for the compilation of this preliminary report. We also wish to thank Dr. Stokes for the interest he has taken in this work and for the aid which he has at all times generously extended to us.

A SYNTHETIC MILK MEDIUM

H. A. WHITTAKER, B.A.,

Laboratory Division, Minnesota State Board of Health.

Natural milk, which has long been used as a medium for bacteriological growth, presents many points which detract greatly from its value in exact determinations.

For several years there has been used in this laboratory an artificial milk as a substitute for natural milk. This medium* consists of a solution of nutrose and lactose in distilled water. It has many advantages over the natural milk. It does, however, present certain disadvantages, in that nutrose is a more or less proprietary article, the exact composition of which is not generally known. It is said to be a sodium-phosphate-casein. In order to obviate this difficulty, experiments have been undertaken with definite solutions of caseinogen dissolved in distilled water, to which is added sodium hydrate, calcium chloride, and a certain amount of lactose. Varying amounts of each of the ingredients have been tried and the following method of preparation has been found to give a very satisfactory medium: Fifteen grams of pure caseinogen are dissolved in 100 c.c. of a 1 per cent. solution of sodium hydroxide in distilled water. Eighteen to 24 hours may be required for a complete solution. After the caseinogen is dissolved the solution is diluted to about 900 c.c. with distilled water. Ten grams of lactose and 0.1 grams of calcium chloride are added and the solution made up to 1,000 c.c. with distilled water. It is then neutralized and made + 0.3 with N/1 HCl, using phenolphthalein as an indicator. This medium is sterilized in an autoclave at a 107 degrees for 20 minutes. The finished product should be a clear, transparent solution. When the medium has a reaction of +0.3 about 24 hours are usually required for coagulation with an active strain of B. coli. When the reaction is neutral a somewhat longer time may be required to produce similar results. This medium has been thoroughly tested on the routine test for B. coli and apparently meets all requirements. It has several advantages over artificial milk previously described, *viz.*:—

1. It is easy to prepare.
2. It has definite composition.
3. Its transparency makes it easily possible to distinguish between precipitation and coagulation.
4. The materials required for its manufacture can be kept constantly on hand.

Read before the Laboratory Section, American Public Health Association, Havana, Cuba, December, 1911.

* *American Journal of Public Hygiene, Vol. XX, No. 3, August,* 1910.

FURTHER OBSERVATIONS ON CHEMISTRY OF DISINFECTANTS

DR. WILHELM DREYFUS,

New York.

In my paper read last year before this Section, I divided the Chemical Disinfectants which are most commonly used in sanitary practice, into six distinct classes, but owing to limited time, was not able to describe more specifically the chemical nature of each individual group. I feel that Health Officers, Laboratory men and others in charge of sanitary work, to whom the proper selection of a disinfectant is entrusted, should be as familiar with the chemical, physical, bacteriological and physiological properties of the available products, as the analytical chemist must be with the purity of his reagents, or the synthetical chemist with the nature of the chemicals he uses in his research.

I will briefly recapitulate the six classes into which disinfectants should be divided, namely:

1. Reducing agents.
2. Oxydizing Agents.
3. Absorbents and Deodorants.
4. Toxic Agents and Precipitants.
5. Producing Chemical Compounds.
6. Coal-Tar Products.

I will also give you what should be considered the Ten Commandments of a Disinfectant, namely:

1. High Germicidal Power.
2. Stability in Presence of Organic Matter.
3. Homogenous Composition.
4. Ready Solubility in All Proportions.
5. Non-Poisonous to Man or Higher Animals.
6. Non-Corrosive to Skin or Metals.
7. Power of Penetration.
8. Economy in Cost.
9. Power to Deodorize.
10. Power to Remove Dirt or Grease.

If we submit the six classes of Disinfectants mentioned above to the scrutiny of these Ten Commandments our choice must fall invariably on Coal-Tar Disinfectants. However, during the last year I had occasion to examine the Bulletins of nearly all our State Boards of Health, and they all, with few exceptions, religiously recommend, under approved disinfectants:

Fire, Water, Chloride of Iron, Milk of Lime, Bi-Chloride of Mercury, Formaldehyde and Carbolic Acid.

These bulletins further call attention to the great danger in the use of some of these approved disinfectants, such as toxicity, corrosion and irritation to those

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that are called upon to apply them, and yet in spite of all these disadvantages, very few Boards include in their recommendations "commercial coal-tar products" of approved bacteriological efficiency, although they fulfill better than any others the Ten Commandments of an ideal Disinfectant; even the coal-tar disinfectants described in the United States Pharmacopœia are never recommended. Furthermore, in purchasing Bi-Chloride of Mercury, Carbolic Acid and Formaldehyde no bacteriological efficiency is guaranteed, and unless the purchaser makes a chemical analysis of the product, he has no information as to its value as a germicide; with reliable coal-tar disinfectants a guarantee of the value of the product is furnished, based on recognized bacteriological tests. Whether the discrimination is due to lack of knowledge on the part of the officials of the chemical advantages and the bacteriological efficiency of the coal-tar products, or whether the fact that these coal-tar disinfectants are what is termed "proprietary," is not in my province to answer.

Before entering on a discussion of these facts, however, I will criticise the chemical disinfectants which do receive the sanction of State and Municipal Boards of Health in their regular bulletins, namely, Bichloride of Mercury, Chloride of Lime, Carbolic Acid, Milk of Lime, etc.

We find that *Bichloride of Mercury* is still considered the "non plus ultra" of disinfectants, which affords a farcial display of ignorance on the part of those responsible, or indifference for consideration of progressive work. *Bichloride of Mercury* is precipitated by albumen, soap, etc., and is moreover readily converted into an insoluble sulphide when brought into contact with organic matter containing sulphur, which is quite inert so far as germicidal action is concerned. Chick and Martin have proven without a doubt the fallacy of Bichloride, when they say, "Whereas very low concentrations of mercuric chloride are effective against B. typhosus, or B. pestis, with the method employed, viz., treatment with H_2S, at the end of 15 minutes, it was found impossible to kill Staphylococcus pyogenes aureus by treatment with a 5 per cent. solution of Bichloride for this length of time."

The *Oxydizers*, such as Chloride of Lime and Permanganate, under certain conditions, have a value as disinfectants; but when diluted with organic fluids, such as urine, this value rapidly diminishes, according to tests made by Sommerville. Geppert states in a paper, from which I think it is well to quote, "I have found that the layers in which the infectious organisms lie, may offer far higher resistance to the disinfectant than the bacteria themselves. The question of how to penetrate the layers in which the organisms are imbedded is the most important of all. The resistance of the infective organism to the disinfectant is of an importance wholly inferior to that which a minute layer of organic matter can interpose to the penetration of the disinfectant." Gruber showed that for efficient disinfection of cattle cars, a solution of Chlorinated Lime had to be preceded by a thorough cleansing with water under pressure, and preferably at a high temperature; that the Chlorinated Lime solution had then to be applied six or seven times before satisfactory results could be obtained.

As regards *Carbolic Acid*, I would like to emphasize that under this term anything is included from pure Phenol to 95 per cent. liquid carbolic. The product, as we well know, is difficult to dissolve in water, and is highly corrosive. The bulletin of one of the State Boards of Health calls attention to this fact when

they say, "When seven ounces of carbolic acid to a gallon of water are used for washing casings, floors, etc., care should be taken not to immerse the hands or other parts of the body in this solution." As to bacteriological efficiency of Carbolic Acid, Koch said as far back as 1881, "That a 5 per cent. solution of Carbolic Acid is incapable of trustworthy disinfection, even when the objects to be disinfected lie for 24 hours in a quantity of the solution, so large relatively to the bulk of the objects, that there can be no question whatever of a weakening of the disinfectant by its absorption or decomposition."

Milk of Lime, which acts as an absorbent and deodorant, may be used with great advantage as a whitewash, but it does not deserve any mention under the head of germicides; unless it is freshly prepared each time, it is apt to form the inert carbonate.

If the lack of knowledge regarding germicidal efficiency is the cause of the discrimination against coal-tar disinfectants, I will say, since we have now in the "Hygienic Laboratory Phenol Coefficient Method," developed by Doctors Anderson and McClintic, a standard bacteriological method for testing disinfectants, no such fears need be entertained.

If, however, the second reason should prevail, namely: prejudice against so-called proprietary products, I would consider it a most unjust stand to take, for it would simply mean protection of the interests of one set of chemical manufacturers to the detriment of those of another set of chemical manufacturers.

You all know that Corrosive Sublimate, Carbolic Acid and Formaldehyde are not natural products; they are not found in nature, but are products of a chemical industry, the same as coal-tar products; furthermore, in the case of Formaldehyde, this industry absolutely represents a monopoly in this country. As a chemist, interested in this branch, I know that the production and sale is in the control of one company, and our protective duty prevents any competition from abroad.

A disinfectant to be trustworthy in practice must have not only a considerable stability against decomposition by organic matter and a considerable capacity for penetrating it, but also a high specific disinfectant power, so as to allow it to give adequate disinfection in the dilutions which enable it to work at its best. In my judgment these conditions can only be fulfilled for dirty surfaces by using a soap-disinfectant of known and high bacteriological efficiency, and well-marked cleansing power. The following practical test is a vivid demonstration of the usefulness of coal tar disinfectants.

With a view to compare laboratory results obtained with the coal-tar emulsions with those in practical work and in order to determine the cleansing qualities as compared to soap and water, the following practical test was carried out:

Two coal-tar products and Formaldehyde 37 per cent. strength were used, showing the following coefficient when tested by the "Hygienic Laboratory Phenol Coefficient Method."

Disinfectant.	Coefficient.
Coal-Tar Product A	5.41
Coal-Tar Product B	2.72
Formaldehyde 37 per cent	0.337

Several railroad cars were cleaned with each disinfectant; samples of scraping were taken from different portions of the floor of the car, both before and after

cleaning. The scrapings taken from the floor after cleaning were from points immediately adjacent to the place where scrapings were taken before cleaning. These scrapings after proper preparation were examined to determine the bacteria contained therein. The cleaning of the cars was handled by a regular force and in the regular manner according to a certain established railroad practice.

FORMALDEHYDE, 37 PER CENT.

Varying percentages of Formaldehyde were used in the manner described above, ranging from one part by weight, commercial strength Formaldehyde, to 100 parts of water, from 1 per cent. solution to a 3 per cent. solution. It was found necessary to use a 3 per cent. solution of Formaldehyde before germicidal results were obtained, and with a 3 per cent. solution of Formaldehyde the odor was so strong and pungent as to make it impractical to be used.

COAL-TAR PRODUCT A.

Varying percentages of the disinfectant were used in the manner described above, ranging from 0.38 per cent. to 1.93 per cent., and it was found necessary to use a solution of at least 1.93 per cent. of the disinfectant before satisfactory germicidal results were obtained. With this percentage of disinfectant, satisfactory cleansing qualities were obtained, but in this case the paint or varnish surface, after cleansing, seemed to be slightly dimmed, requiring an additional washing with clear water.

COAL-TAR PRODUCT B.

Varying percentages of the disinfectant were used, ranging from ¾ of 1 per cent. to 5.32 per cent in the manner described above. It was found necessary to use 5.32 per cent. of the disinfectant to secure proper germicidal results, and with this amount of disinfectant satisfactory cleansing qualities were obtained, except the paint or varnish on the floors or sides of the cars seemed to be slightly dimmed and required a rinsing with clear water.

Of the three disinfectants considered above, Coal-Tar Product A has the greatest efficiency, based on the Phenol Coefficient and as a cleansing material in scrubbing cars it is far superior to Formaldehyde.

The penetrating power of coal-tar disinfectants is proved by their relative efficiency, when tested by the Glass Rod, the Silk Thread and the Hygienic Laboratory Phenol Coefficient Methods, which is also corroborated by the work of Dr. Francis H. Slack, published in the 29th Annual Report of the Boston Board of Health; this would tend to minimize the erroneous conclusions as to penetrating power, arrived at by Drs. Arthur I. Kendall and Martin R. Edwards in their work, published in the *Journal of Infectious Diseases*, Volume 8, March, 1911.

In that investigation the authors at the suggestion of Dr. Rosenau exposed test organisms in infected cylinders of agar of definite diameter to the germicide for definite periods of time.

To quote from their publication, they say, "At stated intervals the agar cylinders are removed from the disinfecting solutions and washed with sterile water. A plug of agar about 3 mm. in diameter is then removed from the cylinder, or cylinders, by means of quill tubing. This plug of agar is taken from the center of the agar cylinder, along its long axis. It is placed in sterile broth and incubated at the body temperature for several days, during which time observations are made to determine the presence or absence of growth. By comparing the results obtained with a given disinfectant and those obtained under the same

conditions with carbolic acid as a standard, a ratio may be established which expresses in terms of carbolic acid the combined germicidal and penetrating power of the bactercidal substance in question."

They find that Formaldehyde, even in relatively weak solutions, appears to be the most efficient of the germicides tested, which included carbolic acid, chloride of lime, and bichloride of mercury, and two coal-tar disinfectants, one of which possesses a Hygienic Laboratory Phenol Coefficient of 16. The authors themselves admit that there are objections to their method, one of which is, that agar is a substance not met with in nature, and that the results obtained might conceivably not be applicable in practice. They seem to forget that the reason for their high results obtained with Formaldehyde is due to a process of osmosis, in which the gas of the Formalin solution is absorbed by the moist agar, and retained chemically, and therefore such a method of testing the penetrating power of disinfectants is absolutely unreliable and contradictory to the practical findings as described in my test referred to above.

The percentage of waste which occurs in the use of chemical disinfectants is probably higher than with any other routine practice, chiefly because of their injudicious selection and insufficient dosage. Of these two characters the most difficult to check is the intrinsic efficiency of the preparation, and I think it is mainly due to this difficulty of expressing the bacteriacidal efficiency in chemical terms that so many inefficient substances are used, allowing avoidable infection to be spread, and large sums of money simply thrown away.

It would be detrimental in the highest degree to chemical and bacteriological research without which continued progress is impossible, if the field is not open to any efficient disinfectant, without putting the consumer at the disadvantage to be at the mercy of a single proprietor. The real question to be decided is the means by which an effective control can be provided over the capacity of a disinfectant to disinfect, and, given compliance with the essential conditions which I have named, there is great practical advantage in so specifying the specific efficiency of a disinfectant that it may be open to all comers.

In this way, after a preliminary examination on the other points necessary to a satisfactory disinfectant, which points can be well and definitely expressed in a specification, and readily verified on deliveries, any number of disinfectants can be compared directly to the value of their disinfecting power.

In concluding I may be permitted to outline the necessary points of a proper specification which State Boards of Health and other institutions should adopt.

SPECIFICATION.

The disinfectant fluid submitted shall be miscible in water in all proportions to form a homogeneous emulsion and shall be free from sediment to run freely from the package at all times. It must be non-poisonous, non-corrosive, and non-caustic. It must possess a Phenol Coefficient of not less than 4 when tested by the "Hygienic Laboratory Phenol Coefficient" method of the U. S. Public Health and Marine Hospital Service, against cultures of Bacillus typhosus. The deliveries of the successful bidder will be tested from time to time, under the above mentioned method, and should any delivery be found inferior to the sample specified, the contractor will forfeit the sum of $100 for every such failure.

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SCARLET FEVER AND THE SCHOOLS

The relationship between the aggregation of children in schools and the rate incidence of some of the commoner communicable diseases, has always been an important question. It is of particular significance in the case of scarlet fever. A casual consideration of the general facts leaves one in doubt as to the relative merits of the two contentions, one of which, insisting on the close connection between scarlet fever and the school months, the other stoutly maintaining that scarlet fever incidence is only slightly affected through the bringing together of the children.

It is recognized that there is a serious loss of the children's time resulting from the closure of schools, and from the wilful detention from schools by nervous parents, a nervousness which is of course oftentimes excusable. It seems probable that much of this is unfruitful as a method of preventing the spread of the disease. The arguments presented in a recent paper by Dr. D'Ewart, of the Manchester (England) Board of Education, which is abstracted in the Public Health notes in this issue, point out forcibly the dangers of jumping at too rapid conclusions to explain the well recognized increase of scarlet fever in the fall.

Scarlet fever control is a problem which worries and perplexes health officials. Many modern methods of sanitation have apparently failed to cope with this disease, and decrease in both morbidity and mortality are hard to bring about even where there is a good system of inspection of schools.

Is there not too much of a tendency to patiently await the discovery of the scarlet fever organism with the expectation of finding a solution of the problem there? While the discovery of the organism would be a noteworthy advance, yet it does not follow that it is at all a necessity. Yellow fever and smallpox can be effectively controlled as the result of observations and researches made without any exact knowledge of the parasites of the diseases.

We shall have to change our methods if we are going to effectively combat scarlet fever. In order to find out what changes are indicated, we need to have thorough epidemiological and statistical studies of scarlet fever in different sections of the country.

All kinds of variations in the number of cases and deaths are to be noted in a survey of scarlet fever returns from the large cities of the United States. A Southern health officer has suggested the possible relationship of temperature to

explain the paucity of cases in his city. Opportunities for school infection are certainly not lacking there.

The thorough studies on typhoid fever that have been made in several American cities during the past decade suggests the need for investigations of a like nature for scarlet fever. The JOURNAL will be glad to receive communications from public health and education authorities on the whole question of the influence of schools as propagators of communicable disease.

A NOTABLE INNOVATION

It is interesting to look back over the span of years since the New York Department of Health placed tuberculosis on the list of reportable diseases. At that time, there was much opposition to the plan and at first the Department only required the reporting of cases by institutions, it being merely requested that physicians report their private cases. Eventually the ordinance became mandatory for both institutional and private cases. The recent decision of this same Health Department to treat social diseases in a like manner is of unusual importance.

The first step has been taken in requiring the reporting of all cases of social diseases by institutions and dispensaries, and physicians are requested to report cases coming to their attention in their private practice. It will be especially important to note how many cases of the latter will be reported. It is to be hoped that the physicians will respond and notify the Department of their cases, withholding the names if they so desire. No one denies the value of having a full reporting of cases of communicable disease, but the difficulties and pitfalls that beset the path of venereal disease control are many and differ in various respects from those confronting the control of tuberculosis, diphtheria, etc. Each step must be made with extreme caution, as a misstep might retard progress very materially. We wish the New York Department of Health success. If it can be demonstrated that this metropolitan city can get good results from this procedure, it might be a great incentive to other communities to take similar action.

NOTICE TO HEALTH OFFICERS

It is the intention of the editors to devote a special section of the JOURNAL to a review of the annual reports of state, provincial, and local Boards of Health. In order that this may be done in a satisfactory manner, it is requested that the managing editor be placed on the mailing list of such departments so that there may be no delay in bringing to the attention of the readers of the JOURNAL the important work being executed in all parts of the country.

It is suggested that all other printed matter (Bulletins, Leaflets, etc.) issued by such departments be also forwarded. A column devoted to personal items would likewise prove of interest to our subscribers and notes of this kind will be gladly used whenever possible.

All reports, bulletins, notes, etc., should be sent to the Managing Editor, AMERICAN JOURNAL OF PUBLIC HEALTH, 755 Boylston Street, Boston, Mass., U. S. A. A circular letter containing these requests will shortly be mailed to the State, Provincial and Municipal health departments. It is suggested that public health officers do not wait for this, but place the name of the Managing Editor on their mailing list without delay. It is earnestly desired to have the JOURNAL thoroughly represent the Public Health authorities of the four countries belonging to the American Public Health Association and to that end the co-operation of everyone interested is needed.

A FALSE ALARM OF YELLOW FEVER AND HOW IT WAS MET BY THE HEALTH DEPARTMENT

DR. JUAN GUITERAS,

Director of Health, Cuba.

As a plea for the prompt and frank declaration of the appearance of epidemic diseases, and as a demonstration of what can and should be done on such occasions, I believe that it may be of interest to narrate our recent experience with a false alarm sounded from Banes, reporting a supposed outbreak of yellow fever among field laborers in a large sugar estate there.

I claim that you cannot meet such an emergency if you pretend to hide things. On that account as soon as we had confirmation from competent authority to the effect that one of the suspicious cases at Banes might be yellow fever, for the purpose of sanitary precaution we made it known to our neighbors that we were investigating the matter.

The town of Banes, with its sugar mill, is situated at the other end of the Island in the Eastern province, and upon a sub-branch of the Cuba Company Rail-

BARRACKS READY FOR FUMIGATION

way. With respect to the time, distance and means of communication, Banes is as far from Havana as New Orleans is from Washington, with the disadvantage in our case that passengers and material have to transfer twice on the road.

The clinical data which I am about to review briefly are furnished by Doctors Mario G. Lebredo and Juan Ruiz Ariza. The prompt execution of the measures of defense we owe to Dr. Gabriel Custodio, chief of the disinfection department, and his assistants.

On Sunday, the 19th of November, we received a telegram from Dr. Ariza, health officer of Banes, which stated that he had "three cases of confirmed typhus icteroides, properly screened, in the United Fruit Company Hospital." Yellow fever has more than once been associated with fruit companies, and Dr. Ariza is

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a careful student. That same night, with the approval of the Secretary, Dr. Custodio with a capataz and 10 experienced men of the disinfection brigade, embarked on the first train with all the necessary material. Dr. Lebredo as yellow fever expert also accompanied the party. They arrived in Banes late Monday night, and by Tuesday the sulphur pots were fuming in the barracks occupied by the infected gang of men. The local health officer with his men assisted in the operation.

About 25 persons were quartered in the several buildings, one of which was a palm hut, and all of the structures together had a housing capacity of 75 men. On Friday and Saturday, the 24th and 25th, the cases were decided not to be yellow fever and the party returned to Havana.

The diagnosis of yellow fever during the first three days is not always easy. We can understand very readily that there may be vacillations at that time and even later, but there should be no mistake in the end. The final decision should be right, and the sanitarian must learn to wait for it. I believe that there is less likelihood of making a mistake than with any other of the infectious diseases for which we do not possess a positive laboratory method of diagnosis.

BUILDING COVERED FOR FUMIGATION

The following facts concerning the four suspected cases of yellow fever are presented.

The examination of the temperature charts of the patients showed decidedly remitting curves, falling at times below the normal. This readily suggested a diagnosis of malaria. In the case of one of the patients, José Vazques, who was infected with benign tertian malaria, this was easily done on the field. The other patients were found to be infected with *Laverania malariæ* or tropical tertian malaria and the parasites were demonstrated after careful examination in the laboratory.

Other general considerations that excluded the diagnosis of yellow fever are the following:

1. From the viewpoint of yellow fever the charts of the patients were considered hyperthermic. The temperatures rose to 40 deg. C. (104 deg. F.), and even higher. Such a fever in amarillic (yellow fever) infection, especially if it occur after more or less decided remissions, is indicative of a grave process, and

should be accompanied by well-developed icterus, marked albuminaria and some hemorrhagic manifestation, if not black vomit. Such was not the case in our patients.

2. None of these cases had any indication of hemorrhage. One of them, Ramón García, who had persistent vomiting, even in the eleventh day of the disease, vomited at times a clear watery fluid, and at times a yellowish fluid without a speck of blood. The gums did not bleed.

3. The albumin in the urine rarely exceeded a mere trace, seldom sufficiently well marked to show any precipitate; and this only after cooling. In the case of García, before our arrival, the presence of much albumin in the urine was noted, as a result of the Esbach test. This method of testing is especially deceptive in connection with yellow fever. Soon afterwards, though the temperature of the patient was rising once more, there were found only traces of albumin by the heat and acetic acid method.

ENTIRE BUILDING COVERED WITH CANVAS

4. Icterus that might be considered suggestive of yellow fever, was present only in the case of García. Another patient, Emilio Estévez, had the slight yellowish tinge of the conjunctiva that we frequently meet with in malaria, and the third patient, Cota, presented no icterus whatever. In the case of García, the jaundice was not dissimilar from that of yellow fever, but it is accounted for by the presence of a right-sided pneumonia with tenderness over the gall bladder.

5. Bronchial symptoms. An outbreak of influenza seems to have occurred among these malarial subjects. They all coughed much with expectoration in the later stages, and García had in addition the pneumonic focus already mentioned. This was revealed by the presence of bronchial breathing and a decided dulness extending from the spine of the scapula to beyond the angle of the bone. It is interesting to note that the sputum was not rusty, thus making it still more apparent that there was no tendency to hemorrhages.

Before concluding, I wish to discuss certain symptoms that were once held in repute as diagnostic of yellow fever. I refer to the remission of temperature on the second, third or fourth day, and to the several manifestations of pain.

We can conceive of the said remission being regarded as an important sign only at a time when preventive medicine did not exact the greatest precision in diagnosis; at a time when the disease was called bilious remittent fever in some people and yellow fever in others; when yellow fever was supposed to be a disease of maritime cities and malaria a disease of the country; a time when the diagnosis was based to a great extent on the antecedents of place, of origin, nationality, etc. The sign when present in yellow fever has no value as a distinguishing feature from the malignant form of malaria. In the subtertian type of this latter infection, especially in newcomers who are having their first attack, remissions on the second or third day are the rule. The cases that we are studying are a fair example of this.

With regard to the several manifestations of pain, we find them of equal intensity as in yellow fever, in the first outbreaks of malignant subtertian malaria and in Weil's disease. Pains in the limbs, headache, loin pains or *coup de barre*, characterize these two diseases as well as variola, plague and others. The epigastric tenderness, whether superficial or deep, is almost constant in malignant malaria accompanied by persistent vomiting. We find this condition also in Weil's disease.

The promptness with which the fumigation was done in this case was due to the use of canvas. The buildings and structures to be disinfected were completely enclosed under large pieces of this material. These large pieces of canvas are handled with unusual dexterity by our disinfecting gang. Photographs, taken by Dr. Custodio, showing the method of covering the barracks at Banes prior to fumigation, are shown.

There are two advantages in this process besides that of the rapidity with which a large structure or several buildings together may be enclosed under the awning. One advantage is the absence of extensive preparations in the interior of the building. With the older process of pasting paper over cracks and openings, there was a great deal of noise and agitation within the rooms, with the consequent danger of driving out the mosquitos. The other advantage is that the partial permeability of the canvas allows the fumes to reach everywhere, without leaving air spaces in which the insects might seek refuge against the action of the sulphur gas.

ANNUAL REPORT ON YELLOW FEVER IN THE MEXICAN REPUBLIC

DR. EDUARDO LICEAGA,

Mexico City.

In the report which I had the honor of presenting to this Association in its meeting held in Milwaukee last year, I stated that yellow fever had entirely disappeared from the Territory of the Mexican Republic. This was a fact, and the same favorable conditions continued along the littoral of both seas, up to August of this year, when the first case of that disease was observed, and has been repeated till, at the present moment (November 23rd, 1911), the number reached 47 cases, with 24 deaths, as shown by the table I present.

This was the report which I proposed to present, as I do every year, on the yellow fever conditions in the Mexican Republic, but on the 23rd of this month I received, through the kindness of Dr. Guiteras, Number 3, Vol. VI. of the "Bulletin of the Sanitary and Charity Department of the Cuban Republic" for the month of September of the present year, and which contains the report on that disease which has been rendered by Dr. Mario G. Lebredo, Director of the "Duque" Research Laboratory, and Special Commissioner to Merida for the study of yellow fever. In view of this report I find myself under the imperious necessity of saying a few words with respect to it.

I must first of all render a just tribute of admiration to the distinguished physician who has made such a careful and detailed study of the subject for which he was commissioned by his Government, and at the same time express my thanks, both for the kind phrases with which he refers to the sanitary authorities of Mexico, as well as for the warnings which he kindly gives to those same authorities and which have been taken into serious consideration and will continue to be so taken, as it is our purpose in Mexico to follow the suggestions of those who made such progress in the important studies which are dealt with in Dr. Lebredo's report.

I very much regret the haste with which I have to write these observations; but if I did not do so, even though in a summary manner, I would lose the only opportunity which I have to present them to the meeting of the American Public Health Association which is being held at this moment in the Capital of the Cuban Republic, and which meeting I am specially sorry to say, I cannot attend on account of some very important official duties which require my presence in Mexico City.

For these reasons I beg that the Association will take into its benevolent consideration and toleration those points in which I differ from the opinion of the distinguished physician who went to Merida.

As regards the first three cases of Feliciano Cabrera, Quirino Dolores and Margarito Mendoza, no surprise should be felt at the fact that they were not declared, precisely because, in order to ascertain whether they were yellow fever, fragments of their viscera were forwarded through the Cuban Delegate to that

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Republic, bearing in mind the unquestionable competence of Dr. Lebredo and of the other persons who make a study of yellow fever, because it has always been my intention not to fail in declaring any confirmed case, whilst at the same time I have not felt that I ought to take the risk of spreading an unjustified alarm.

So certain is what I have just said, that a person as competent as Dr. Lebredo, expresses his opinion in the following terms: "And although with only those documents relative to the autopsy, it was not possible to positively assert that the cases were of yellow fever, as on the margin of those documents it was stated, as the only clinical detail, that the disease in two cases had run eleven and twenty-one days, nevertheless I stated in conclusion that the lesions above described and referred to in the autopsy reports, authorized me to consider the cases as possibly yellow fever, and therefore dangerous from an epidemiological point of view."

If he himself, with his great experience, declared them suspicious cases how could I declare them confirmed?

As regards the two first cases of José Blanco and Rosalio Ortiz, declared to be yellow fever by the "Diagnosis Commission," the Board did not entirely support the opinion of Dr. Cazares, that they should be expunged from the list of yellow fever patients, because it is the intention that the Commission, composed of persons who have had sufficient experience in questions of yellow fever, should be the body invested with legal powers in doubtful cases, and as the declaration had already been made, the Board confirmed it and has not struck out those cases from the list of persons attacked.

Acting under the same conviction which animates Dr. Lebredo, that it is necessary to search for cases of yellow fever in those places in which it is endemic, the Sanitary authorities of Mexico have established a service such as does not exist anywhere else, as far as I know, and which consists in a system of domiciliary visits to the non-immunes. In order to carry out this purpose, the entire city is divided into districts, each one under the charge of a physician with a sufficient staff of sanitary agents, and he commences by preparing a schedule of all the non-immunes, which serves to guide the sanitary agents in making a daily visit to the homes of all those persons, for the purpose of isolating in a lazarette,—without waiting, as justly said by Dr. Lebredo, for four or five days in order to give the attending physician time to make the diagnosis of the patient—every person who may be found suffering from fever from any cause whatever. For this reason it is noted that the number of suspects who enter daily into the lazarette is very numerous.

This procedure is that which has served for eight years, to discover in Tampico, Veracruz, Progreso, Córdoba, Mérida and the entire Isthmus of Tehuantepec, the first cases of any outbreak of yellow fever. We thus see that what Dr. Lebredo calls *a search for the cases* has been our constant practise for the last eight years, and thanks to this precaution it has been possible to exterminate yellow fever along the entire coast. I do not make any mention here of the part referring to Campeche and Yucatán, because I will take this matter up later on.

The Board appointed Dr. Carlos Manuel Garcia to proceed to Merida and there make a study of the disease, and as soon as he reached that city, the practice was started of taking the temperature every morning of the soldiers of the 16th and 31st battalions of infantry, a practice which has been kept up, and as

soon as any one of those soldiers or of the women who go into the barracks presented symptoms of fever, the individual was taken to the lazarette.

Dr. Lebredo asks me the following questions: "Do any special sanitary organizations exist in Merida to take charge of the feverish non-immunes and to make the diagnosis of yellow fever?"

Unfortunately, what he observed was true. The suspects were not isolated with the promptitude ordered in the instructions given by the Board of Health to the Chiefs of the Yellow Fever Service; but as soon as Dr. García took charge, the thermometer was applied every day, both morning and evening, to all the soldiers of the two battalions, wherever their duties took them, and as soon as any one of them was found feverish, he was sent to the hospital, whatever might be the cause of the symptom, and this is the dominant idea of the Board which has given rise to the instructions for the domiciliary visits by the agents of the sanitary brigades. If, unfortunately, these instructions were not carried out in Merida, it was not through any defect in the organization, but in the employees, and, as already stated, all these defects were remedied on the arrival of Dr. García. The diagnosis of the disease is not made by the physicians in charge of districts, because their only duty, according to the Regulations issued by the Board, is to apply the thermometer and as soon as the domiciliary visitor discovers a case of sickness, whether in the barracks or amongst the civil population, the patient is at once removed to the lazarette.

The fact that Dr. Lebredo did not find more than one case from the civil population in the lazarette, was not due to any failure in the *search* for cases, but to the fact that the present epidemic has spread very little outside of the two barracks. It is to be deplored that the physician who discovered a child sick with yellow fever did not make the declaration which it was his duty to make, under Art. 262 of the Sanitary Code, and I regret that Dr. Lebredo does not give his name, because that physician contributed, against the interests of the locality in which he resides, to the ignorance of the presence of yellow fever.

It is unquestionable that Dr. García must have given orders not to leave the screened doors of the lazarette open in order to facilitate the service, as that would have rendered the isolation entirely inefficient.

I have certainly given the epidemic the importance which it calls for, and efforts are being made to carry out all the measures which experience has shown us give satisfactory results in other localities, in which yellow fever has been finally stamped out.

The question of screens in the barracks, unfortunately, does not depend on the Sanitary Services, but on the War Department and the Government of Yucatán, for which reason the Board of Health could take no action in the matter, but only request the support of those authorities.

At present, all the dwellings of the men and women who frequent the barracks are under observation, and the temperature of those persons is taken every day, just as with the soldiers.

The traveling Sanitary Agents have orders to prepare a list of the passengers and hand it to the Chief of the Yellow Fever Service in order that those passengers may be kept under observation, when they are non-immunes, and that any of them who fall sick may be isolated. If the journey is longer than that from Merida to Progreso, as happens between Veracruz and Cordoba and Santa

Lucrecia, Coatzacoalcos and Salina Cruz, etc., those Sanitary Agents, as soon as they find feverish symptoms in a passenger, isolate him from mosquitoes within the railroad car itself, by covering him with a mosquito net. If he is seated, this is done by means of a hat which carries a veil that falls to his waist and which is kept in place by small leaden weights. This is, therefore, the purpose of the Board in having traveling agents on the trains.

There is no place in Veracruz set apart for quarantine like the "Triscornia" in Havana, but both in that as well as other ports, the precautions taken of applying the thermometer to all passengers arriving by sea, and if any of them shows symptoms of fever, he is placed in a screened litter, and in that is taken to the lazarette. The non-immunes who arrive and are not feverish, are questioned as to the place of their destination, and if they are to remain in Veracruz, the Sanitary Authorities watch them from day to day, as they do the local non-immunes, whilst if they go to any town in which yellow fever has at some time prevailed, the local authorities are notified, and only those whose destination is the Central Tableland of Anahuac are exempted from observation, because in that region the Stegomyia mosquito does not exist, and if any person arrives there with the disease, as has already happened, he is not in any way dangerous to the community.

With these precautions, which were adopted eight years ago, no cases of yellow fever have been observed from outside sources, because those who arrive are at once isolated in the lazarette or temporary hospital, and therefore have not become foci of epidemics.

Under this system which we have followed against yellow fever, not a single new case of the disease has been observed from the 3rd of November, 1903, and in Veracruz from the 11th of February, 1909, that is to say, during a period of two years and nine months. This shows that the sanitary services established in the Mexican Republic have been efficient on both coasts, with the present exception of Merida.

I repeat that I desire to call special attention to these points, in order that they may serve me for the observations which I will make further on.

The very interesting report rendered by Dr. Lebredo, as a physician of unquestionable competence in matters of yellow fever, gives the impression that the disease spread in Merida by reason of the arrival of the 16th and 31st battalions, and of the recruits received, more specially by the second of these battalions, from the villages in the Territory of Quintana Roo, Campeche, Veracruz, and Merida itself.

As regards the Territory of Quintana Roo, it is possible that the disease may exist there, but it has not been demonstrated. Can we suppose that during the entire period, according to Dr. Lebredo, that yellow fever has existed in Quintana Roo, it has not made itself evident except in mild cases, and has never assumed the form of an epidemic? As regards Campeche, I have to make two important observations.

I.—No epidemic had made its appearance for many years before the month of September, 1910; it has been found impossible to ascertain the cause of the outbreak, that is to say, how the disease was contracted by the Spanish woman who was the first case.

II.—The outbreak in Campeche took place precisely at the time when, for the sake of economy, the Federal Government ordered the disbanding of the Sanitary Brigade in that State.

As soon as the first case appeared, Dr. Carlos Manuel Garcia was sent to the place, but the Sanitary Brigade was reorganized under the direction of the delegate of that port, who was given all the necessary resources in the way of a staff, disinfectants, etc. The State of Yucatan was protected by means of a sanitary station where the passengers traveling on the railroad were examined daily. Dr. Garcia left that port whilst there was still one case of yellow fever, but the service was not abandoned in his absence, as the Sanitary Brigade continued the service to the month of July of the present year. For the above reasons, with all due respect to Dr. Lebredo, I cannot accept the observations he makes with regard to Campeche.

As regards the epidemic in Merida, an interval of twenty months had elapsed between the last case observed there and the first one of those which appeared in the month of August last, and precisely because the first cases were doubtful, the viscera and clinical sheets were sent to Cuba, as stated in the beginning of this report, in order to consult the best experts in yellow fever. In this way attention was roused, not by cases demonstrated through hemorrhage and jaundice, but by cases of such a doubtful character, that Dr. Lebredo, in the first lines of his report, simply states that he is disposed to believe they were cases of yellow fever.

As I have always maintained, I also call attention to the fact that sporadic cases may pass unperceived in towns that are almost entirely immune, because if, as said by Dr. Lebredo himself, there are thousands of non-immunes in the civil population of Merida, how is it possible that during the lapse of twenty months, in the midst of numerous mild cases which pass unperceived, no serious cases should be observed, and when they are, how is it they do not come in series, as happens now in Merida? In connection with this, I desire to call attention to this important point: in the epidemics of yellow fever, as in the case of other transmissible diseases, sporadic cases may be observed; but as soon as the disease takes an epidemic form, there is an uninterrupted succession of cases, in which we can trace the transmission from one to another with intervals of more or less days. To suppose that cases may have existed during a continuous period of twenty months, and pass unperceived because they are all mild and do not give rise to apparent manifestations, is a theory entirely contrary to the teachings of the epidemiology of all diseases, and in all parts of the world. The epidemics of yellow fever in the Mexican Republic have been no exception whatever to that rule, both those which were observed before the establishment of the struggle against the disease, as well as those which have been observed in the eight consecutive years during which that struggle has been carried on in all seasons of the year. In fact, whenever an epidemic spreads, one case is followed by another and this by another and so on. This was observed in the epidemic which prevailed in Campeche during the past year, and which closed with nine cases, and if no more than these were observed, it was because the Sanitary Brigade continued its active work, as I have already said, up to the month of July of this year.

This is what has been observed in the City of Merida. The cases noted by Dr. Lebredo have been followed by a continuous series of new ones, until they reached the proportions already cited.

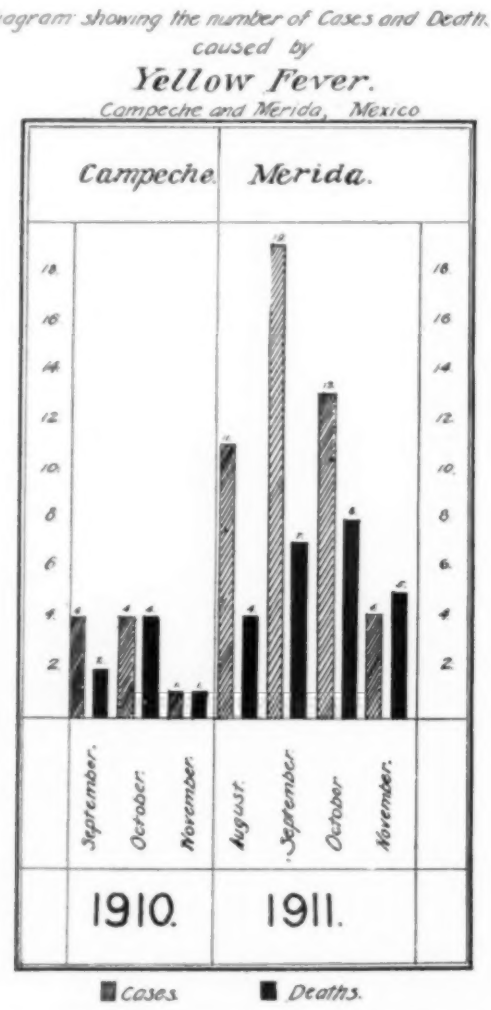
It is not true that a pre-existing endemic was converted into an epidemic only after the arrival of the 16th and 31st battalions, because there were thousands of resident non-immunes in Merida as well as travelers, who are constantly arriving in that city, and amongst them all no case of yellow fever was observed in a period of twenty months. If the first three cases to which Dr. Lebredo refers were not reported, it was because there was no certainty as to the diagnosis, but reported or not, they were followed by those which Dr. Lebredo himself observed in Merida, and the others which have succeeded up to the date on which I close this report.

As regards Veracruz, I must again emphatically declare that no case of yellow fever has presented itself since February 11, 1909.

I repeat here what I told the Sanitary Authorities of Cuba on the 24th of August of that year, in connection with the case of Gallo Mancilla. This Spaniard who had resided in Puebla for over two years (a city in which yellow fever has never appeared), reached Veracruz on the 12th of June, 1909. He remained there for four days and then took passage on the *Fuerst Bismarck*, which sailed on the 16th. On the 17th he showed symptoms of fever. He reached Havana and being suspected of yellow fever, he was taken to the Hospital of "Las Animas," where that suspicion was confirmed, although the case was diagnosed as mild. It has been claimed that he contracted the disease in Veracruz.

I have asked the sanitary authorities of Cuba to explain this fact, because if we claim that a mosquito could have remained infected from the 11th of February when the last case was observed, four months had elapsed, and although Dr. Guiteras has been able to preserve an infected mosquito alive for 154 days, in a bottle in the Hospital of "Las Animas," consequently the insect which stung Gallo Mancilla must have remained infected for the 120 days which elapsed from the 11th of February, how can we suppose that the insect only stung one man, and not a single one of the ten thousand non-immunes who constantly reside in Veracruz, or any of the passengers, who are continually arriving from abroad or from the Central Tableland where yellow fever does not exist? I ask why neither before nor after the 12th of June, 1909, and up to the present date, has no other case been observed in that port? Neither can I find any explanation in the supposed existence of a larval and latent form of yellow fever in the children, which would have maintained the infection without the infected mosquito having carried the disease from anyone of those children to any other person than Gallo Mancilla, either in the four months previous to the 12th of June, 1909, or during all the time that has elapsed since that date. How could it be possible in a city like Veracruz, where physicians are found who have all their lives been attending patients of this class, that a case of the disease should pass unperceived during such a long period? Dr. Lebredo very justly says that, before a case of hemorrhage arises with evident jaundice, there are many others which can only be discovered by very careful study; but is it possible that in such a long period of time a new epidemic should not have arisen and made itself evident as at present in Merida, and not only that it should pass

unperceived by the local physicians, but also by the medical agents who are kept in that port by the Republic of Cuba and the United States? But neither one nor the other of those two officers, whose competence is beyond a doubt, have reported in all that period any case whatever that could have passed unperceived by the local physicians.



This point which I have submitted and which has not as yet been answered by the Sanitary Authorities of Cuba, is what leads me to the following conclusions:

I. That the outbreak in Merida cannot have originated in Veracruz.

II. That this case does not come within the doctrine of the transmission of yellow fever by the mosquito, in which the infection is transmitted from the yellow fever patient to the mosquito, and after a period of incubation lasting twelve days, this insect acquires the fatal property of inoculating non-immunes with the disease.

These conclusions, which I desire to submit for the consideration of this meeting, with a solemn declaration that I do not refer to these cases for the purpose of making any defense against the quarantine which has been imposed on us by the Republic of Cuba, but merely for a scientific purpose; that of clearing up doubtful points.

On behalf of the Sanitary Authorities of Mexico, I place at the disposal of the similar authorities of Cuba and the United States, the entire territory comprised in the Peninsula of Yucatan, in order that persons as competent as the Cuban and American physicians are in matters connected with yellow fever, may carry out the investigations which they think necessary. We are not dealing now with questions of mere local interest, but with those that relate to universal science and the interests of humanity, and which demand solution. The sanitary authorities of Mexico do not claim to be able to solve these problems themselves, and therefore are willing to render any assistance to the two countries above mentioned in order that investigations may be carried out which will clear up these doubtful points.

THE USE OF A MODIFIED HESSE'S MEDIUM FOR ISOLATING THE TYPHOID BACILLUS AND THE CHOLERA SPIRILLUM FROM STOOLS*

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The use of differential media for the isolation of pathogenic intestinal bacteria from the feces has already been successfully applied in the detection of typhoid bacilli, but the most recent technique for the isolation of the spirillum of Asiatic cholera recommends a smear-culture on plain agar. The following brief preliminary report is made, therefore, in order to record certain observations concerning a differential color test for colonies of the typhoid and paratyphoid bacillus, and the spirillum of Asiatic cholera. This medium has been already described previously by Stokes and Hachtel[1] as a modification of Hesse's semi-solid agar, and this medium is prepared in the following manner:

The formula of the medium is as follows:

Agar (dried at 105° C. for half an hour)	5.5 gm.
Liebig's extract of beef	5 gm.
Peptone (Witte)	10 gm.
Lactose	10 gm.
Glycerin	50 gm.
Sodium chlorid	8.5 gm.
Distilled water	1,000 c. c.

Before using, the agar should be dried at 105° C. for half an hour to free it from all moisture. This medium should be kept in an ice-chest, the air of which is artificially provided with moisture.

The agar is dissolved in 500 c. c. of distilled water by heating and the loss of evaporation is made up. The beef-extract is added to the remaining 500 c. c., dissolved by heating, filtered into a sterile flask, and inoculated with the colon bacillus, and then incubated at 37° C. for twenty-four hours. This is for the purpose of reducing and removing all of the muscle-sugar from the medium, so that any organisms acting on muscle-sugar shall not confuse the reaction by producing acid colonies. The sugar-free bouillon is filtered after the incubation, and the peptone, lactose and salt are next dissolved in this fluid, and the loss of evaporation is made up by the addition of distilled water. The two solutions are then mixed and boiled for thirty minutes, the loss of weight being again made up by the further addition of distilled water. It is next filtered, the reaction corrected to a neutral reaction and the 50 c. c. of glycerin added; it is then colored with a solution of Kahlbaum's azolitmin, and 10 c. c. are placed in each

*Read before the Laboratory Section, American Public Health Association, Havana, Cuba, December, 1911.

[1]Stokes and Hachtel. Archiv. of Int. Med., Vol. 6, Aug. 1910, p. 121.

test tube. It is then autoclaved at 15 pounds pressure for twenty minutes, and stored in the ice-box. It is necessary to place tightly fitting rubber caps over these tubes in order to prevent evaporation.

When the bile culture from a typhoid suspect is received at the laboratory it is incubated for twenty-four hours, and a series of dilutions from the incubated bile is then made in the following way: One loopful of the incubated bile is transferred into a water blank, which is shaken, and one loopful from this water blank is transferred into a second water blank. A series of eight dilutions is then made in the melted Hesse medium cooled to 40° C., and the medium from each tube is then poured into a separate plate. The plates are then incubated for twenty-four hours, and if the typhoid bacillus or paratyphoid bacillus is present, the colonies will appear as medium sized, with concentric rings, and will show a distinct pink color. This color reaction enables one to distinguish between the Bacillus typhosus and the Bacillus alkaligenes. We have found this medium of great service in detecting the presence of typhoid bacilli in stools, and when suspicious colonies are obtained a small quantity is mixed with a proper dilution of an immune serum or of a positive typhoid blood. If agglutination takes place, the diagnosis is confirmed by a study of the cultural characteristics.

The previously quoted article described the detection of the typhoid bacillus by means of this medium from drinking water obtained from surface rivers and a well, from sewage, and clinical and "carrier" cases of typhoid infection; and since that time we have continued to use this medium successfully in detecting the presence of the typhoid and paratyphoid bacillus in feces, urine and blood.

We have also obtained the typhoid bacillus from a sewage-polluted stream which contained oyster-beds, and as this condition existed in a community in which two distinct outbreaks of typhoid had occurred, a brief description of the circumstances pertaining to these outbreaks will be offered.

One of these outbreaks gave a record of 35 cases of typhoid fever in a town of about 1,500 persons, many of them living in houses on the banks of the stream in which the polluted oyster-bed was situated. About the same time an outbreak occurred in a large institution partially bordering on this stream, and in a population of about 700 persons, 30 cases of typhoid fever developed. It is not known, however, whether any of the patients obtained oysters from these infected oyster-beds.

The bacteriological examination of the water and oysters from this bar gave the following result: Samples taken from the bar consisted of ten oysters, taken at a depth of 2 feet; and one bacteriological sample of water taken at a depth of 3 feet.

Oysters: The number of bacteria in one cubic centimeter of juice taken from each oyster was 1,800, 1,800, 2,100, 2,400, 2,100, 2,400, 3,000, 1,800, 2,100 and 2,400, respectively; an average of 2,190 bacteria per cubic centimeter of juice for each oyster. Presumptive tests for colon or intestinal bacteria were positive for all ten oysters, and the colon bacillus was isolated from all samples.

Water: The sample of water collected from this bar contained 1,800 bacteria per cubic centimeter. The colon bacillus was found in both one and ten cubic centimeters of the water. An examination of this water for Bacillus typhosus revealed the presence of a bacillus having all the morphological, biological and serological properties of this organism.

The typhoid colonies were recognized by their typical, large, concentrically arranged, pink appearance, and were easily distinguished from the smaller, moist, concentrated colon colonies.

It later occurred to us to test the color reaction of the various spirilla upon this same medium, and we found that the Spirillum choleræ and the Nassik spirillum could be distinguished from the bacilli of the typhoid group by the fact that these spirilla formed a blue colony on our modified medium, due to the alkaline reaction produced. These colonies appeared in twenty-four hours as large, bluish, concentric colonies, with an opaque, nucleus-like centre, and varied in diameter from 5 to 15 millimeters.

We also made a few tests with these two spirilla, using other differential media for this purpose. Smear cultures were made over Endo's medium, and after eighteen hours in the incubator the cholera spirillum appeared as small, pale, gray, translucent, moist colonies with a fine, pin-point red center, and had an average diameter of 1 millimeter. After 42 hours incubation the entire colony was pale pink in color, and had an average diameter of 2 millimeters. On microscopic examination the edges were undulate, with a narrow, decolorized, peripheral zone, which was barely apparent to the naked eye. The Nassik spirillum after 18 hours incubation on Endo's medium formed a pale, gray, translucent, moist colony resembling the typhoid colony incubated for the same length of time. After 42 hours incubation the colony resembled the 18 hour colony of the cholera spirillum.

These experiments failed to disclose anything very characteristic about the appearance of these spirilla either on our semi-fluid lactose-glycerin-litmus agar or on Endo's medium. By the use of our modified Hesse's medium the Spirillum choleræ can, of course, be differentiated from the Bacillus coli and the Bacillus typhosus by the color reaction. Other organisms such as the Bacillus alkaligenes, Bacillus proteus, Bacillus fluorescens, Bacillus fluorescens liquefaciens, and the Bacillus pyocyaneus, however, appear as blue colonies on this medium.

It next occurred to one of us that, since the cholera spirillum produces an amylolytic or starch-splitting enzyme and the colon bacillus does not, starch might prove useful in the isolation of the cholera spirillum from the stools of carriers. We then experimented with starch agar in two forms: one a 3 per cent. starch litmus agar for smear cultures, the other a semi-fluid starch-litmus agar. This latter was made according to the directions given by us in the first part of this article for Hesse's medium save that the glycerin and lactose were omitted and 10 grams of starch were added and the reaction was corrected as before so as to be neutral to phenolphthalein. The meat sugar was, of course, removed by a preliminary inoculation of the broth with the colon bacillus.

The solid medium proved a failure as the cholera colonies could not be distinguished from those of the colon bacillus, both being moist, pale blue and translucent.

When inoculated in the semifluid starch-litmus agar the Spirillum choleræ gave round, spreading colonies without concentric rings, and were pink in color. These colonies measured from 2 to 5 mm. in diameter.

The Nassik spirillum on this same medium resembled the cholera spirillum, as did also the Spirillum of Finkler-Prior and the Spirillum metchnikovi.

The typhoid bacillus gave round, spreading, pale blue colonies with the typical concentric zones. These colonies measured from 3 to 10 mm. in diameter. The colonies of the Bacillus alkaligenes resembled closely those of the Bacillus typhosus.

We have studied the appearance of both the Bacillus dysenteriæ (Shiga) and the Bacillus dysenteriæ (Harris). Both of these organisms showed small, blue surface colonies, and deep pin-point colonies of neutral reaction.

The Bacillus choleræ suis and the Bacillus enteriditis formed round, blue, spreading colonies without concentric rings; the diameter of these colonies ranged from 2 to 10 mm. The Bacillus coli and the Bacillus communior formed circular, blue, spreading colonies which varied in diameter from 2 to 10 mm.

The Bacillus proteus, the Bacillus cloacæ, and the Bacillus gasoformans presented round, spreading, blue colonies with a diameter of from 2 to 8 mm. The odor of the Bacillus proteus was distinctly sharp and ammoniacal. The Bacillus proteus fluorescens gave moist, blue, circular colonies of from 2 to 3 mm. in diameter.

The Bacillus capsulatus (Friedländer), the Bacillus lactis ærogenes, and the Bacillus acidi latici, all gave small, blue, non-spreading colonies.

The Bacillus pyocyaneus formed round, spreading, blue colonies without concentric zones; these colonies ranged in diameter from 2 to 10 mm.

The Bacillus subtilis formed very large, round, blue, spreading colonies without concentric zones.

CONCLUSIONS.

We believe that the use of semi-solid agar according to the methods described above will distinguish between the typhoid and paratyphoid bacillus and other motile intestinal organisms by means of the characteristic pink color of the former colonies. The colon bacillus is occasionally motile and resembles the typhoid colony, and these colonies can only be surely distinguished by using agglutinative typhoid serum. The use of starch instead of lactose and glycerin in the semi-solid medium produces a characteristic color reaction for the intestinal spirilla. These spirilla split up the starch and produce an acid reaction of the medium. We intend to continue our experiments, but suggest the use of these semi-solid media at this time as a step towards securing characteristic color tests for colonies of the intestinal pathogenic organisms.

THE HYGIENE OF THE SWIMMING POOL

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The hygiene of swimimng pools is a very interesting question, and one of prime importance, because it is recognized that the swimming pool which is not kept in good sanitary condition may develop into a source of danger instead of being a place for beneficial and healthful recreation. The purpose of the experiments described in this paper was to ascertain the general sanitary condition of the swimming pools at the University of Wisconsin, and to determine the increase in pollution of the water through use.

Experimental work commenced in January, 1910, at the suggestion of Dr. M. P. Ravenel, Director of the State Hygienic Laboratory, and consisted of bacteriological and chemical analyses. Samples for analysis were taken daily from each pool and at times twice a day, *i. e.*, morning and afternoon. The bacteriological examinations included counts of the bacteria per c.c. growing on gelatin at 20 deg. C. and on litmus lactose agar at 37 deg. C., and presumptive and confirmatory tests for B. coli. The chemical analyses included determinations of chlorine, of nitrogen as free ammonia, albuminoid ammonia, nitrites and nitrates, and were made for the purpose of detecting the increase of these elements during the week, and further to ascertain the relative delicacy of each as an index of the pollution of the pool. The methods followed in these examinations and analyses were those prescribed by the Committee on Standard Methods of Water Analysis of the American Public Health Association.

There are two swimming pools at the University of Wisconsin, one for men and one for women, located in their respective gymnasia. The pool in the men's gymnasium is eighty feet long, twenty feet wide, four feet deep at one end and ten feet at the other, giving a total capacity of approximately 97,000 gallons. The floor and walls are of white tile. The tank is emptied, cleaned and filled with lake water once a week, the water remaining in the pool for five days. The temperature of the water is maintained at 70 deg. F. Approximately 275 men use the tank daily, and on Saturdays a considerably larger number. Before entering the pool each man is required to take a thorough shower bath, during which most of the superficial dirt is washed off and a considerable amount of pollution thus prevented.

The women's pool is sixty feet long, twenty feet wide, three and one-half feet deep at one end, and seven feet deep at the other, having a total capacity of approximately 70,000 gallons. The water is pumped from Lake Mendota and is filtered before passing into the pool. The two filters, which are of the pressure type, using coke and scrap iron as the filtering material, were installed for the purpose of removing vegetable growths which at times imparted a very disagreeable odor to the water, especially after the water remained in the tank for a few days. The pool is emptied and the floor and walls thoroughly scrubbed each Saturday, and the tank allowed to air until the following Monday, when it is

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filled. Bathing is not permitted until the next morning. The water is kept at a temperature of 75 deg.-80 deg. F. During the four days that the pool is open about 200 women use it, an average of about fifty persons per day. The regulation relative to bathers taking shower baths before entering the pool is also in force at the women's gymnasium.

In order to determine the general sanitary condition of the pools experiments extending over several weeks were made. For the sake of briefness, all the data are not given here, but the results are representative. Bacteriological and chemical analyses of samples taken from the men's tank were made in January, March, and April, 1910, and in January and February, 1911, and of samples collected at the women's pool during the same months of 1911.

In the first series of experiments, conducted in January, 1910, two samples were collected daily, morning and afternoon. Plating and inoculation of fermentation tubes was done as soon as the samples reached the Hygienic Laboratory, within fifteen to thirty minutes after collection. A sample was always taken from the supply pipe while the water was flowing into the pool and analyzed in order to ascertain its initial quality, and for comparative purposes.

The tabulated data for the first series of experiments from January 18 to January 29, 1910, inclusive, are given in table 1.

TABLE 1.

BACTERIOLOGICAL EXAMINATIONS OF WATER FROM MEN'S SWIMMING POOL.

		Gelatine count per c. c. 20° C	Litmus, lactose Agar count per c. c. 37° C	B. coli present in .1cc 1cc 10cc	Chlorine p. p. m.
Pipe sample	1-18-10 4 P.M.	150	5	— — +	1.4
Tank "	1-19-10 10 A.M.	455	349	— — +	1.4
" "	1-19-10 4 P.M.	5100	920	— — +	1.5
" "	1-20-10 10 A.M.	29600	3600	— — +	1.4
" "	1-20-10 4 P.M.	14800	1350	— — —	1.4
" "	1-21-10 10 A.M.	1400	440	— — +	1.6
" "	1-21-10 4 P.M.	540	440	— — +	1.8
" "	1-22-10 10 A.M.	620	220	— — +	2.1
" "	1-22-10 4 P.M.	1260	575	— — +	2.1
Pipe sample	1-24-10 4 P.M.	30	18	— — +	1.1
Tank "	1-25-10 10 A.M.	163	420	— — +	1.1
" "	1-26-10 10 A.M.	1470	500	— — +	1.1
" "	1-26-10 4 P.M.	21970	660	— — +	1.2
" "	1-27-10 10 A.M.	16900	1550	— — +	1.2
" "	1-27-10 4 P.M.	9700		— + +	1.2
" "	1-28-10 10 A.M.	1280	240	— + —	1.2
" "	1-28-10 4 P.M.	380	270	— — +	1.3
" "	1-29-10 10 A.M.	590	128	— — —	1.8
" "	1-29-10 4 P.M.	1560	405	— + +	2.0

The results show a gradual increase in the number of bacteria growing on gelatine. The maximum was reached about the middle of the week, followed by a decrease until Saturday, when an increase was apparent. The fluctuations in the counts on litmus lactose agar at 37 deg. C. were similar to those on gelatine; an increase took place during the first days of the week, then a decrease following a maximum, which was reached after approximately forty-eight hours. Saturday afternoons the number of bathers is generally large, and this probably accounts for the increase noted at the end of the week. Bacillus coli is usually present in ten c. c. and sometimes in one c. c. of the lake water. During the two weeks B. coli was generally present in ten c. c. and only occasionally in one c. c. of pool water. Only a slight increase in the chlorine content was apparent; in fact, throughout the entire series of experiments the chlorine showed very little increase.

In Table No. 2, bacteriological and chemical results for the week of January 16, 1911, are tabulated. The gelatine and litmus lactose agar counts manifest similar fluctuations to those given in Table No. 1. B. coli was generally present

TABLE 2.

BACTERIOLOGICAL EXAMINATIONS OF WATER FROM MEN'S SWIMMING POOL.

		Gelatine count per c c 20° C	Litmus Lactose Agar count per c. c. 37° C	B. coli present in .1cc 1cc 10cc	Chlorine in p. p. m
Pipe sample	1-16-11 4 P.M.	440	5	— — +	1.0
Tank "	1-17-11 10 A.M.	1200	910	— — —	
" "	1-17-11 4 P.M.	14000	770	— + +	1.2
" "	1-18-11 10 A.M.	22500	2250	— — +	
" "	1-18-11 4 P.M.	13500	3010	— + +	1.1
" "	1-19-11 10 A.M.	8600	1900	+ — +	
" "	1-19-11 4 P.M.	10700	1900	— — +	1.2
" "	1-20-11 10 A.M.	3050	1410	— — +	
" "	1-20-11 4 P.M.	4500	900	— — +	1.6
" "	1-21-11 10 A.M.	620	120	— — —	
" "	1-21-11 4 P.M.	1600	538	— — +	2.0

CHEMICAL ANALYSES OF THE SAME.

		N as Free NH_3	N as Alb. NH_3	N as NO_2	N as NO_3	Total	Chlorine in p. p. m
Pipe sample	1-16-11 4 P.M.	0.118	0.274	0.003	0.02	0.415	0.8
Tank "	1-17-11 10 A.M.	0.156	0.276	0.005	0.03	0.467	1.4
" "	1-18-11 10 A.M.	0.176	0.380	0.007	0.03	0.593	1.7
" "	1-19-11 10 A.M.	0.180	0.400	0.012	0.025	0.617	2.2
" "	1-20-11 10 A.M.	0.250	0.380	0.025	0.03	0.685	2.1
" "	1-21-11 10 A.M.	0.220	0.420	0.022	0.03	0.692	2.8

in ten c. c. and only occasionally in one c. c. The chemical data show a small but gradual increase in free ammonia, albuminoid ammonia, nitrites, and, of course, total nitrogen resulting from the addition of nitrogen in these forms. The amount of nitrogen as nitrates remained quite constant, while the chlorine increased slightly.

In general the chemical results show the presence of considerable nitrogenous organic material in the lake water and the initial increases in the number of bacteria per c. c. on gelatine and agar were without doubt the result of the natural growth of the bacteria in a favorable environment, and were not caused by the addition of polluting material. As B. coli is usually present in ten c. c. of the lake water its confirmation generally in ten c. c., but only occasionally in one c. c., of pool water cannot be considered as the result of contamination. From the data in tables Nos. 1 and 2, and additional results not given in this paper, it appears that the hygienic condition of the men's swimming pool is generally good.

Table No. 3 shows the bacteriological and chemical results after one liter of urine had been added to the water in the pool in order to determine whether or not any material increase in the nitrogen and chlorine content would be manifest

TABLE 3.

EXAMINATIONS OF WATER FROM MEN'S SWIMMING POOL AFTER ONE LITER OF URINE HAD BEEN ADDED.

BACTERIOLOGICAL.

		Counts on Gelatine per c.c. 20° C	Count on Litmus Lactose agar per c.c. 37° C	Gas in Dextrose Broth .1cc 1cc 10cc.	B. Coli present in .1cc 1cc 10cc.
Pipe sample	2- 6-11 11 A.M.	425	17	— — +	— — +
Tank "	2- 7-11 11 A.M.	9000	130	— + +	— + +
" "	2- 8-11 11 A.M.	45000	1770	— + +	— + +
" "	2- 9-11 11 A.M.	15000	105	+ + +	+ + +
" "	2-10-11 11 A.M.	9000	47	+ + +	+ + +
" "	2-11-11 11 A.M.	5000	258	— + +	— + +

CHEMICAL.

		N as Free NH_3	N as Alb. NH_3	N as NO_2	N as NO_3	Total	Chlorine in p. p. m.
Pipe sample	2- 6-11 11 A.M.	0.070	0.230	0.002	0.05	0.352	2.1
Tank "	2- 7-11 11 A.M.	0.090	0.240	0.003	0.03	0.363	1.7
" "	2- 8-11 11 A.M.	0.120	0.180	0.009	0.04	0.349	3.0
" "	2- 9-11 11 A.M.	0.160	0.220	0.011	0.04	0.431	2.0
" "	2-10-11 11 A.M.	0.190	0.160	0.012	0.03	0.392	3.2
" "	2-11-11 11 A.M	0.250	0.310	0.016	0.02	0.596	1.7

in the daily analyses. The urine was added Monday afternoon, February 6th, after a sample had been taken at the pipe. The maximum count on gelatine was relatively quite high and the counts remained high during the week. The agar counts were somewhat low, but B. coli was constantly present in ten c. c., one c. c., and occasionally in one-tenth of a c. c. Its continued appearance in one c. c. was significant in this series, because it was usually absent from one c. c. of the pool water in most of the experiments. There is no essential difference between the results of the chemical analyses of this series and those shown in Table No. 2. In general, the chemical results showed that nitrogen determinations were more delicate than chlorine determinations as an index of the sanitary condition of the pools.

TABLE 4.

BACTERIOLOGICAL EXAMINATIONS OF WATER FROM MEN'S SWIMMING POOL.

		Counts on Gelatine per c.c. 20° C	Count on Litmus Lactose agar per c.c. 37° C	Gas in Dextrose Broth		B. Coli present in	
				1cc	10cc	1cc	10cc
Pipe sample	3-28-10 11 A.M.	275	16	+	+	+	+
Tank "	3-29-10 11 A.M.	445	480	+	+	+	+
" "	3-29-10 3:30	920	483	+	+	+	+
" "	3-30-10 11 A.M.	5630	680	+	+	+	+
" "	3-30-10 3:30	19100	1140	+	+	+	+
" "	3-31-10 11 A.M.	24000	1190	—	+	—	+
" "	3-31-10 3:30	10000	1080	—	+	—	+
" "	4- 1-10 11 A.M.	1700	690	—	+	—	+
" "	4- 1-10 3:30	2570	780	—	+	—	+
" "	4- 2-10 10:30	2800	560	+	+	+	+

Same samples treated with .5 part and 1 part available chlorine respectively for 30 minutes.

		Count on Gelatine per c.c. 20° c		Count on Litmus Lactose agar per c.c. 37° C		B. coli present in			
		.5 part av.	1 part cl.	.5 part av.	1 part cl.	1cc .5 part av.	10cc .5 part cl.	1cc 1 part av.	10cc 1 part cl.
Pipe sample	3-28-10..	0	0	1	0	—	—	—	—
Tank "	3-29-10..	4	0	5	0	—	—	—	—
" "	3-29-10..	8	0	8	0	—	+	—	—
" "	3-30-10..	4	0	2	2	—	—	—	—
" "	3-30-10..	30	0	45	1	—	—	—	—
" "	3-31-10..	130	5	120	1	—	—	—	—
" "	3-31-10..	14	0	27	1	—	—	—	—
" "	4- 1-10..	15	0	9	0	—	+	—	—
" "	4- 1-10..	12	0	30	1	—	—	—	—
" "	4- 2-10..	27	0	66	0	—	+	—	—

The results of a series of experiments made for the purpose of determining the amount of available chlorine in parts per million necessary to produce practically a sterile water are given in Table No. 4. Two hundred and fifty c. c. samples of water taken from the men's swimming pool were treated with hypochlorite of lime in the proportion of five-tenths of a part and one part of available chlorine per million for thirty minutes. The bacteria content of the samples was materially reduced and B. coli generally destroyed when five-tenths of a part of available chlorine was used; one part of available chlorine produced, for practical purposes, sterility, and completely destroyed B. coli.

In order to demonstrate in a practical way the efficiency of calcium hypochlorite as a disinfectant, a solution of "bleach" was made up and its strength in terms of available chlorine ascertained. This solution was poured into the swimming pool which had been in use by the students for three days, during which period there was a considerable increase in the bacterial content of the water as shown by examination. The amount of hypochlorite solution added resulted in a concentration of 0.41 gram of "available chlorine" per million parts of the water. The results are tabulated below:

Date 11/11/11	Gel. Count per c. c. at 20°	Per cent decrease	Litmus Lactose Agar Count per c. c. at 37° C.	Per Cent Decrease	Colon Present in .1 c. c.	1 c. c.	10 c. c.
Before addition	4,000		3,600		—	—	+
½ hr. after	600	85%	400	89%	—	—	+
24 hrs. after	650	84%	500	86%	—	—	+
48 hrs. after	730	82%	590	84%	—	—	+

These results show that 0.41 parts per million effected a very satisfactory reduction of the number of bacteria, and indicate clearly the practical value of calcium hypochlorite as a disinfectant. It is reasonable to presume, in view of the results given in table 4, that one application per week of calcium hypochlorite to the swimming pool water in the ratio of one part of available chlorine per million, would preserve the pool in excellent sanitary condition.

Bacteriological and chemical data of some of the experiments on samples taken from the women's swimming pool are given in Tables 5 and 6. The counts on litmus lactose agar remained uniformly low; the number of bacteria growing on gelatine followed a curve of fluctuation somewhat similar to the curve suggested by the counts shown in Tables 1 and 2, while B. coli was generally absent from ten c. c. The chemical data substantiate in a general way the bacteriological findings.

These results indicate that the hygienic condition of the women's swimming pool is entirely satisfactory and that the method of filtration employed yields a desirable degree of purification.

TABLE 5.

EXAMINATIONS OF WATER FROM WOMEN'S SWIMMING POOL.

BACTERIOLOGICAL.

	Counts on Gelatine per c.c. 20° C	Count on Litmus Lactose agar per c.c. 37° C	Gas in Dextrose Broth .1cc 1cc 10cc	B. Coli Present in .1cc 1cc 10cc
Pipe sample 1-23-11 4 P.M.	260	10	− − +	− − +
Tank " 1-23-11 4 P.M.	570	35	− − +	− − +
" " 1-24-11 11 A.M.	1680	46	− − +	− − +
" " 1-25-11 11 A.M.	2300	47	− − +	− − −
" " 1-26-11 11 A.M.	2200	30	− − +	− − −
" " 1-27-11 11 A.M.	4250	29	− − −	− − −

CHEMICAL.

	N as Free NH_3	N as Alb. NH_3	N as NO_2	N as NO_3	Total	Chlorine in p.p.m.
Pipe sample 1-23-11 4 P.M.	0.128	0.328	0.002	0.01	0.468	1.6
Tank " 1-23-11 11 A.M.	0.020	0.310	0.010	0.04	0.380	2.2
" " 1-24-11 11 A.M.	0.045	0.300	0.010	0.06	0.415	1.5
" " 1-25-11 11 A.M.	0.060	0.460	0.011	0.05	0.581	3.2
" " 1-26-11 11 A.M.	0.140	0.580	0.016	0.05	0.786	3.3
" " 1-27-11 11 A.M.	0.080	0.330	0.018	0.07	0.498	2.4

TABLE 6.

EXAMINATIONS OF WATER FROM WOMEN'S SWIMMING POOL.

BACTERIOLOGICAL.

	Counts on Gelatine per c.c. 20° C	Count on Litmus Lactose agar per c.c. 37° C	Gas in Dextrose Broth .1cc 1cc 10cc	B. Coli Present in .1cc 1cc 10cc
Pipe sample 2- 6-11 11 A.M.	425	17	− − +	− − +
Tank " 2- 6-11 11 A.M.	4400	48	− − −	− − −
" " 2- 7-11 11 A.M.	4250	34	− − −	− − −
" " 2- 8-11 11 A.M.	4600	123	− − −	− − −
" " 2- 9-11 11 A.M.	2100	10	− − +	− − −
" " 2-10-11 11 A.M.	2750	6	− − +	− − +

CHEMICAL.

	N as Free NH_3	N as Alb. NH_3	N as NO_2	N as NO_3	Total	Chlorine in p.p.m.
Pipe sample 2- 6-11 11 A.M.	0.070	0.230	0.002	0.05	0.352	2.1
Tank " 2- 6-11 11 A.M.	0.005	0.290	0.006	0.10	0.401	2.8
" " 2- 7-11 11 A.M.	0.010	0.300	0.007	0.08	0.397	1.7
" " 2- 8-11 11 A.M.	0.010	0.260	0.006	0.06	0.336	1.9
" " 2- 9-11 11 A.M.	0.005	0.280	0.007	0.07	0.362	2.1
" " 2-10-11 11 A.M.	0.100	0.160	0.007	0.08	0.347	2.2

CONCLUSIONS.

The results of the series of experiments indicate that the pools at the University of Wisconsin are kept in good sanitary condition, and that there is little danger of transmission of disease.

The application of hypochlorite of lime affords an efficient method of disinfection and when used in the ratio of five-tenths part of available chlorine to 1,000,000 parts of lake water a practically sterile water results. This method of disinfection offers an excellent means of insuring a hygienic swimming pool.

REPORT OF COMMITTEE ON EDUCATION OF THE PUBLIC AS TO THE COMMUNICABILITY AND PREVENTION OF GONORRHOEA AND SYPHILIS

At the meeting of the American Public Health Association, held at Milwaukee in September, 1910, your Comittee presented a Report and the following Recommendations, which were adopted:

1. The Committee recommend the recognition, study and control of the prevalence of gonorrhœa and syphilis, as with all other communicable diseases, in order to ascertain the distribution of the diseases.

2. An educational campaign for parents of all social classes and children of all ages and sexes. This teaching should be not only moral, but also medical in the widest sense. It will not do at present to rely on the moral argument.

(a) Proper distribution of circulars, pamphlets, and other literature by state health departments through all suitable channels.

(b) State health departments to instruct all of its local health officers in sexual matters and direct them to make a systematic effort to educate the people in their respective communities.

(c) State health departments to make a definite and determined effort to awaken and interest the medical profession in this fight against venereal diseases.

(d) State health departments to send out especially trained paid teachers and lecturers of their own, supported by exhibits and lantern slides, to address special meetings of parents, health officers, medical men, teachers and others in schools, colleges, churches, etc., on these and other preventable diseases.

(e) State health departments to encourage the organization of local leagues or associations whose purposes shall be the support of and control of a crusade against the spread of all communicable diseases.

1. Said societies to include every profession and walk of life.

2. To depend upon philanthropists for necessary funds rather than upon subscriptions for financial support.

(f) Health departments to interest and provide instruction in sexual matters for students of the upper grades.

1. By introduction of biology into the graded courses of all schools.

2. By introduction into the textbooks on physiology of upper grades, instructions in reference to anatomy and physiology of the urinary and sexual organs.

3. By special instructions to normal school students who are to become the instructors.

4. To impress upon the presidents, deans, preceptors and teachers of those subjects the necessity of repeated instructions in reference to the communicability of syphilis and gonorrhœa and to inculcate a morale of protection among the student body.

Presented to the American Public Health Association, Havana, Cuba, December, 1911.

(g) To utilize health departments for the proper occasional presentation of the subject and to discourage the display of advertising matter which encourages the exposure to dangers in these diseases.

(h) To utilize church clubs, fraternal societies, trade unions, women's clubs, and especially mothers' clubs for instruction of parents.

(i) Health departments to recommend the enactment of laws for:

1. Physical inspection and segregation of prostitutes.
2. Notification and report (by number, if desired) of venereal cases.
3. Physical examination of men before marriage; and that male applicants for marriage licenses be required, in order to obtain the same, to submit to examination by a duly qualified physician to determine if they are free from venereal diseases.
4. Keeping open free night dispensaries and maintenance of special dispensaries and hospitals for those diseases.
5. Making it a crime knowingly to spread venereal disease.

(j) Advocacy of temperance on account of the relationship between alcoholism and venereal diseases.

(k) Advocacy of personal cleanliness and venereal prophylaxis.

(l) Advocacy of early marriages.

In order to bring the Report and Recommendations to the attention of the State Boards of Health, the Chairman of the Committee mailed reprints to the respective Secretaries with the inquiry how far they would be willing to endorse the recommendations of the Committee and secure remedial action.

In answer to the inquiry, eight replies have been received:

Dr. Henry D. Holton, of Vermont, "cordially endorses all the recommendations made in the report."

A Bill will be presented at the next meeting of the Vermont Legislature which provides that "the term infectious, contagious or communicable disease dangerous to public health shall include chancre, chancroids, gonorrhœa, syphilis or other venereal diseases."*

Dr. William F. Snow, of California, writes:—

"In my judgment the report is most excellent in its presentation of the subject and in the carefully considered recommendations. . . .

"I believe that under the division ("i") that notification and report should be given first importance and that physical inspection and segregation of prostitutes should perhaps follow item No. 5. . . .

"I think that you know our State Legislature took action last March endorsing the ruling of the State Board that venereal diseases must be reportable."

Dr. Swarts, of Rhode Island, writes:—

"As at the meeting when the report was submitted I am ready to endorse all the recommendations except physical inspection and segregation, inasmuch as I believe that experience shows that results are not obtained except to a slight extent where military supervision might be enforced."

Dr. C. O. Probst, of Ohio, writes:—

"While I believe in compulsory notification, I do not believe that our physicians or the public would back up the enforcement of such a law. Our Board

*(For full draft of bill see "Social Diseases," October, 1910).

would doubtless favor the second and third recommendation and has already taken some action to carry out the fourth recommendation." . . .

Dr. Calvin S. White, of Oregon, writes:—

"I have carefully examined the report . . . and want to heartily endorse everything that you have said; particularly your recommendation as to it being a campaign of education. The only possible exception that I could take to the matter is the prevalence of venereal diseases. My own experience and observation of others on this Coast leads me to believe that there are not so many affected men as are usually given in statistics. However, this is merely a matter of opinion and you may put me on record as heartily endorsing the recommendations."

Dr. H. M. Bracken, of Minnesota, writes:—

"I am not ready to express an opinion at present," and requests that copies of the Report be mailed to all the Members of his Board.

Dr. S. J. Crumbine, of Kansas, writes:—

"I will say that in a general way I am in entire accord with the recommendations of the Committee, but in this state I have already been blocked in an attempted educational campaign by the State Printer refusing to print our pamphlets on Sex Hygiene, which we had intended for wide distribution through the medium of our travelling Tuberculosis Exhibit.

"I fear it would be a long time, judging from the present indifference of the lay community, before it will be possible for this Department to carry out all the recommendations of the Committee relating to State Health Departments.

"If you have any suggestions to make as to how this indifference may be overcome and how the Legislature might be made to see the necessity for making appropriations for carrying on the work outlined by the Committee, and whether or not your association would assist this Department in securing such legislation, in our 1913 Legislature, I will be glad to have you advise me."

Dr. William C. Woodward, of the District of Columbia, writes:—

"1. The first recommendation I endorse.

"2. The second recommendation, in so far as it calls for 'an educational campaign for parents of all social classes and children of all ages and sexes,' should be worded so as to make it clear that it is not intended to recommend that children of all ages and of both sexes be instructed as to the communicability and prevention of gonorrhœa and syphilis. If this recommendation is intended to mean—and I have no doubt that such is the case—that children of all ages and of both sexes should be instructed with respect to the biology of reproduction, in a manner suitable to their respective ages and sexes, I am heartily in accord with the Committees' recommendations.

"Under the second recommendation, paragraph (e), sub-paragraph 2, it is recommended that state health departments encourage the organization of local leagues or associations, whose purpose shall be the support and control of a crusade against the spread of all communicable diseases, to depend upon philanthropists for necessary funds rather than upon subscriptions for financial support. It is not clear whether it is meant that in connection with this work state health departments should depend upon philanthropists or that the proposed leagues or associations should depend upon philanthropists for such support, although the obscurity is, I think, due rather to the form in which the recommendation is printed than to any great uncertainty as to the meaning of the Committee. Person-

ally, I believe that the Government should provide the funds necessary for the work of the health departments, even if such work is the encouragement of the organization of local leagues and associations for the purposes named. It might be proper for such leagues or associations to depend upon philanthropists for necessary funds, but the distinction between depending, on the one hand, 'upon philanthropists for necessary funds,' and, on the other hand, 'upon subscriptions for financial support,' is not clear.

"Under Section 2, moreover, paragraph (I), sub-paragraph 1, it is recommended that health departments urge the enactment of laws for the physical inspection and segregation of prostitutes. Unless this includes both male and female prostitutes, I am not ready to subscribe to it. It may be urged that it is more difficult to inspect and segregate male prostitutes than female prostitutes, but under an American system of government, I doubt very much if this is the case. The female prostitute who cannot pass inspection simply plies her vocation clandestinely. In any event, in so far as relates to both male and female, some definition should be given of the word 'prostitute.' The man or woman who indulges in promiscuous sexual intercourse is, in my judgment, none the less a prostitute because he or she may have other means of support than is the regular inhabitant of a house of prostitution.

"Under Section 2, furthermore, paragraph (i), sub-paragraph 5, it is recommended that the health department recommend the enactment of laws making it a crime knowingly to spread venereal diseases. This recommendation, in my judgment, to be susceptible of execution should provide for the enactment of laws making it a crime for anyone who has been duly informed that he has syphilis or gonorrhœa, and who has not been advised by competent medical authority that he is cured of that disease to have sexual intercourse without taking due precautions to prevent the communication of the malady from which he is suffering or to do any other act liable to spread infection.

"From the foregoing statement, as you can readily see, I am in the main in hearty accord with the Committee's recommendations, but I do not feel that I can go on record as endorsing them without the limitation set forth above."

It is to be regretted that criticisms and comments have not been more numerous, and it is hoped that this is not indicative of official apathy to a class of communicable diseases, which constitute a greater peril to society than all acute infectious diseases combined.

On the whole, we believe that gratifying progress has been made during the past few years in the campaign for the prevention of so-called vice diseases.

In addition to the steps taken by California, the health department of the City of New York has officially decided to place the venereal diseases—Syphilis and Gonorrhœa—upon its index of infectious and communicable diseases, and ask, not demand, that all such cases be reported to it by the medical profession. The Department has further appealed to the City Board of Assessments and Apportionment for means for the erection of a pavilion for the care of venereal patients and this appeal is backed up by the Medical Society of the County of New York (see "Social Diseases," July, 1911).

The Committee in its report expressed the belief that the main remedy lies in public education which should be carried on along the same lines which is making the work of local societies and the National Association for the study and pre-

vention of tuberculosis so effective. It is gratifying that commendable progress has been made in this direction.

The movement in this country, according to Prince A. Morrow[1], started by the organization in New York City of the American Society of Sanitary and Moral Prophylaxis in February, 1905.

The educational work of this society has been attempted in three directions: 1st. By public meetings and conferences; 2nd. by lectures and publications. Among the excellent pamphlets issued by this Society may be mentioned the following: 1st. The Young Man's Problem. 2nd. Education in the Physiology and Hygiene of Sex for Teachers. 3rd. The Relations of Social Diseases with Marriage. 4th. The Boy Problem. 5th. How My Uncle, the Doctor, Instructed Me in Matters of Sex. 6th. Health and the Hygiene of Sex for College Students. 7th. Sex Instruction for Little Girls (in preparation). 8th. Unprotected Young Women (in preparation).

In addition the Society has also distributed several thousands of reprints from "Charities and Commons," a symposium on the Treatment of Venereal Diseases; a symposium on Blindness of the Newborn—and a leaflet on the Origin of this Movement, its objects, aims and methods of work. Over 225 lectures have been delivered under the auspices of the Society.

"Social Diseases," a quarterly journal for the report of the progress of this movement, has been published by the New York Society since January, 1910, and, according to Dr. Morrow, it is expected that it will soon become a monthly publication.

Similar Societies have been formed in the following States: *Pennsylvania*, founded March 26, 1906. Membership in June, 1909, 1,004; 25,000 of a circular of Information for Women were distributed largely among the employees of the department stores and factories of Philadelphia and vicinity. Public meetings in Philadelphia and in various cities of the State were held.

The *Indiana Society* was organized in June, 1907. Over 30,000 copies of a general educational pamphlet have been distributed by the State Board of Health. The lecture work has been done chiefly by Professor Woods of the Medical Department of the State University and by Dr. Hurty of the State Board of Health in different parts of the State.

The *Maryland Society* was organized in 1908 under the auspices of the Medical and Chirurgical Faculty. A large number of Educational pamphlets have been distributed by the Society through the genito-urinary departments of the dispensaries and other channels. The Society employs a field secretary to give instruction to small groups of mothers and girls, and lectures have been given before Men's Clubs, Mother's Clubs, church societies, social settlements, etc.

The *California Society* was organized April 19, 1909, and has accomplished very effective educational and legislative work. The first pamphlet on the "Great Red Plague" was published in the Official Bulletin of the State Board of Health. Dr. Francis M. Greene, a tactful and fearless speaker, is President, and Dr. David Starr Jordan of the Leland Stanford, Jr., University, is Vice-president of the Society; both are very effective men, and have secured many excellent co-workers.

[1] We are indebted to Dr. Morrow and Dr. Folkmar for much of the information contained in this report concerning the various state and city organizations and their activities.

Similar organizations have been formed in the State of West Virginia, Connecticut, Michigan, and are in process of formation in Rhode Island, New Jersey and Virginia. A number of State Boards of Health like California, Indiana, Rhode Island, Ohio, Massachusetts, Vermont, Washington, have issued educational leaflets. One of the recent California Bulletins contains reference to the subject of early marriages and to the subject of asexualization.

Societies have also been organized in Chicago (1906), Milwaukee (1906), Portland (1907), Spokane (1908), St. Louis (1909), Denver, Jacksonville, and more recently in the City of Mexico, Syracuse, Buffalo, and other cities.

Most of the societies are educational in their activities, by means of lectures and circulars. The Spokane society has secured the co-operation of the Board of Education and "the most successful work of the year has been made possible in the meetings for parents conducted by the Society in the various school buildings. . . The newspapers of the cities have favored us with increasing publicity. The principal of the school has announcements made to the pupils . . . of the meeting that they may remind their parents. . . . The principal also furnishes the Society with a list of the parents . . . and the Society mails a letter to each parent. Through the efforts of the Society, the question of sex education has been brought before the State Board of Education of Washington and is being considered by that body." (From the Second Annual Report of the Spokane Society.)

"The American Federation for Sex Hygiene" was organized in St. Louis, June, 1910, at a meeting of delegates from eleven of the societies of different states. Former President Eliot of Harvard is the Honorary President. There are now eighteen societies represented in the Federation. This is to be an endowed society. (For further particulars see "Social Diseases," July, 1911.) The social aspect of venereal diseases has received more attention in medical and general periodicals during the last year than ever before. Mr. Samuel Hopkins Adams in the Journal of the American Public Health Association, November, 1911, discusses the subject in his usual vigorous and intelligent style and says: "That the atmosphere is clearing, there can fortunately be no doubt. A speaker may deal frankly with sex hygiene to-day, on platforms from which he would have been angrily driven a few years ago. Newspapers which have been virtuously indignant at the mere mentioning 'private diseases' (except in quack advertisements, heavily paid for) will now print more or less guardedly the warnings of medical officialdom."

According to Merck's Archives (November, 1911), the Ohio Senate unanimously passed Senator McDonald's Bill providing for the physical examination of males contemplating matrimony.

We believe that Dr. Morrow is entirely within the bounds of reason when he declares: "It may be confidently stated that indications point unmistakably to one immediate result of the campaign of education, viz., the limitation of venereal infections in marriage. It is abundantly evident from numerous letters and personal communications with physicians in various parts of the country that a sense of the danger and criminality of marrying with an uncured venereal disease has begun to penetrate the consciousness of the laity, and that more and more

men contemplating matrimony consult their physicians as to their physical fitness for marriage and parentage."

In our report last year we state that it was a lamentable fact that the United States and Great Britain, two typical Anglo-Saxon nations, should lead all other armies and navies in the prevalence of venereal diseases, and attributed this undue prevalence largely, if not entirely, to the fact that the sentiment in these two countries, both in and out of the profession, is strongly against recognizing the evil, and therefore had not been made a subject of popular education. As a result of criminal ignorance and neglect the admission rate for this class of diseases in the U. S. Services was ten times greater than in countries where serious attention has been paid to the consideration of the problem.

It is gratifying to report upon the authority of the Surgeon General, U. S. Army, that the propaganda for the prevention of venereal diseases in the Army which was initiated by his office in January, 1909, has begun to show good results as indicated by a reduction in the admission rate from 196.99 in 1909 to 174.95 in 1910 for the entire army, and a reduction from 177.46 in 1909 to 155.51 for the army in the United States proper.

The results in the United States Navy are indicated in the following letter from Surgeon General C. F. Stokes:—

"The curve of the admission rate for the primary venereal diseases (syphilis, chancroid and gonorrhœa), since 1900, show a constant rise from 52 per 1,000 in that year, to 108 per 1,000 in 1906. In the next year it fell to 85, the cause thereof not being apparent.

"The years 1907-8-9-10 exhibit a rapid rise which, in a large measure, was undoubtedly more apparent than real, due to instructions requiring the recording of all cases and to the more frequent physical examination of the personnel.

"The maximum 164 was reached in 1910, the returns for the first six months of this year showing a reduction in the annual rate to 147. This reduction is regarded as an actual one, and not to a failure to report cases inasmuch as it is accompanied by a corresponding fall in the admission for the sequelæ and complications of venereal disease.

"The reduction is almost entirely due to a lessened rate for gonorrhœa, that of syphilis and chancroid remaining practically constant.

"It is hoped that the establishment of the technic planned for adoption by this bureau will show a pronounced fall in the incidence of venereal diseases in the future.

"Lack of uniformity of procedure, personal indifference and prejudice account for the failure to secure more promising results. Prophylaxis has semi-official recognition only, and therefore is not at present under satisfactory control."

Respectfully submitted,

GEO. M. KOBER,
Chairman.

Chart showing the rate per 1000 of cases of venereal diseases in the Army and Navy. The rate for 1911 is based on reports for the first six months only.

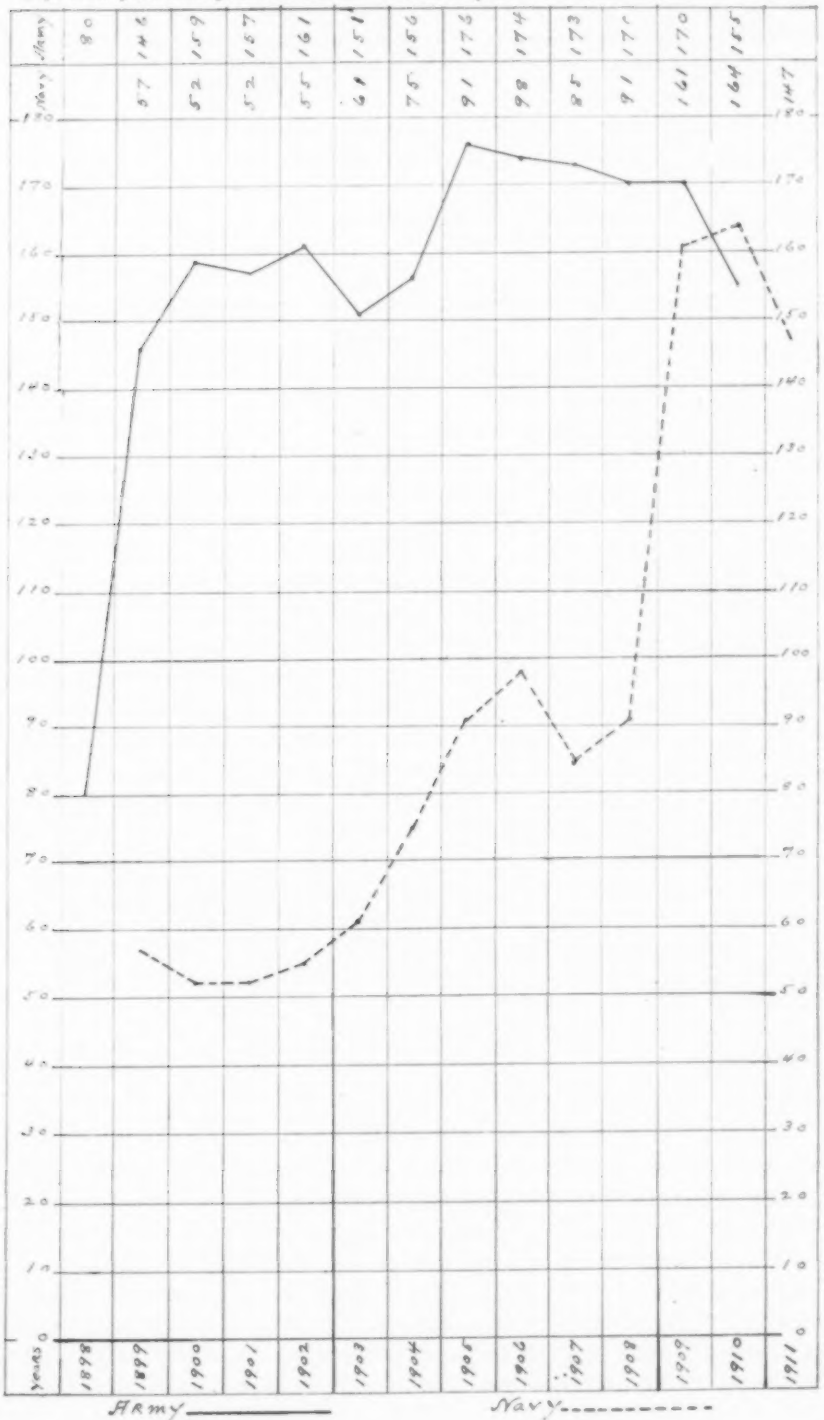

TABLE SHOWING ADMISSION RATE PER 1,000 FOR VENEREAL DISEASE IN THE U. S. NAVY.

Disease	1909	1910	1911*
Gonorrhoea	105	107	91
Chancroid	28	35	29
Syphilis	27	23	27
	160	165	147
Admissions for Sequelae	28	32	27

*Annual rate based upon six months' returns.

Discussion.

Dr. Schenck:

Some twelve months ago I was forced to take active steps in the improvement of conditions resulting from venereal diseases in Norfolk—not only in the protection and conservation of the health of our people, but to protect and foster our business and commercial interests. The recruiting and training station of the U. S. Navy Yard, situated at Norfolk, sends large numbers of men to our city, sometimes several thousand. They are a class of men who, when granted shore leave, as they regularly are, take in all of the various and sundry sports of which our city abounds, and, like all other seaport cities, we have a somewhat densely populated "segregated district." We were given to understand by the naval authorities that too many of their enlisted men were being infected with venereal troubles, and if we wished to have them ashore we must do something to prevent this. Our merchants, of course, profit quite largely from the patronage of the sailors, and our business interests demanded that we protect them as far as it lay in our power, so, after several conferences with the Commandant of the Naval Stations, I decided to inaugurate inspection and surveillance of these women to that end.

I appointed four physicians and one officer. The physicians were empowered to make regular inspection of all women in Norfolk engaged in public prostitution. The physician practising here were requested to give to the Department of Health a confidential report of their cases of gonorrhœa and syphilis, and where the case was contracted. The proprietor or proprietress of all houses of assignation and prostitution are required to notify the Health Department of the arrival or departure of all inmates within twenty-four hours of the arrival or departure, as the case may be, and are warned and required, under penalty not to permit any person to ply her vocation until she shall have been examined by one of the physicians and granted her card. This card does not state that the woman is free from

venereal disease, not at all, but simply states over the signature of the examining physician that the holder of the card (giving her name, age and description) has complied with the requirements of the Department of Health of Norfolk.

When we find an inmate infected we isolate and quarantine her or take her to the hospital for treatment. If she or the landlady violates any of the rules or requirements of the Department of Health, we arrest and fine her.

When we started in this work there was some 268 cases of venereal disease among the recruits at the stations mentioned, and while these men are coming and going all the time, I think the station before our inspection, etc., averaged about two hundred cases at all times. These have steadily decreased, notwithstanding shore leave is regularly granted this large number of men, until now we only have some fifteen or sixteen cases at the stations. The Navy Department there are delighted with results and are actively co-operating with us. From reports given me by many physicians whom I have interrogated along this line, I find also that the number of cases of venereal diseases in their practice is steadily decreasing. We find that the system of inspection and surveillance not only is productive of good results by the immense reduction of venereal diseases, but by this method of regular examination of a very careless class of people we detect other diseases—infectious skin diseases and particularly tuberculosis. We have sent several of the women to the Catawba State Tuberculosis Camp, several home to their parents, and by this method of requiring an immediate report by the landlady of the arrival of new inmates we have been enabled to reclaim some of them who had not before been an inmate of a house of prostitution and sent them home. I believe the work to be a good one. It has many phases and ramifications—is far reaching in its effects and will, if persistently and conscientiously carried out, do great and lasting good.

Dr. Dowling:

In the State of Louisiana during the last fifteen months this subject has been discussed publicly in 256 towns, and we have endeavored to keep the ravages of these diseases constant before the people. We have urged fathers to teach their boys and mothers to teach their daughters that they might escape from the bad effects frequently resultant from immorality. On numbers of occasions we have appealed to teachers to co-operate to the extent of instructing the boys and girls, by taking them apart when they have reasons to believe their students have not been properly taught, and tell them in chaste, dignified language the benefits derived from leading clean, moral lives.

We fully appreciate the importance of teaching the children the dangers of Gonorrhœa and Syphilis.

Dr. Snow:

This is one of the most important subjects before the American Public Health Association, and one I believe should be brought continually before the public. There are many men in the medical profession everywhere when this subject is brought up that take an attitude of secrecy. This attitude must in some way be broken down before much can be accomplished in an administrative way. The California State Board of Health has gone on record before the public to the effect that these diseases are similar to other communicable diseases and must be reported. A law making the reporting of these diseases mandatory was passed by

the last Legislature, but it is provided that cases may be reported by office number. The City of Sacramento is now proceeding, exactly as in other communicable diseases, to investigate and isolate cases reported. Other California cities are beginning to do the same. This applies to male cases as well as to women. In time the loyalty of the people will give us a thoroughly good control of all of the active and clandestine prostitutes. There should be a public clinic where venereal diseases are treated just as we now have tuberculosis clinics open to all persons who choose to state that they are indigent. These clinics should be open for advice, and also to men and women who would like to be cured of these diseases, if necessary, without giving their name and address. To my mind, an institution established in this way would be of special value in aiding us to reach the large number who are the prey of unscrupulous and dishonest druggists and "free consultation experts."

Dr. Mohr:

One phrase of the report on which I profess ignorance as to methods of bettering this particular part and I would like information. I have heard it stated that children of all ages should be instructed on these subjects. When it comes to the question of how to reach school children and how is this delicate subject to be treated so as not to further stimulate a morbid curiosity, I can easily understand how to reach the older children, boys of 15, one can easily reach them and possibly the girls, but when it is said children of all ages should be instructed along these lines I must confess I am at a loss. If any one can kindly specify the method by which this information can be given, I will certainly be very much obliged.

Dr. Woodward:

I do not understand that the Committee recommends that children of all ages be given the same instruction about this subject. What can with advantage be taught children of different ages, and methods of approach suitable for different ages, can be learned by studying the literature that has been published for the laity concerning it. Not that all such literature is good or even fit for the purpose for which it was printed, but that the professional reader can utilize so much of it as his professional judgment and his good sense tell him is available for his use upon any particular occasion.

Dr. Snow:

I should like to ask Dr. Guiteras to inform us what is being done here in Havana to control syphilis and gonococcus infection, and whether segregation as practiced is considered a satisfactory measure.

Dr. Guiteras:

I have never looked into this subject very carefully. The registration of prostitutes is enforced in Havana. The funds derived from the inscription are employed in the administration and policing of this department, and in the inspection and care of the infected. There is a special Commissioner in charge of these funds and there is a surplus of several thousand dollars. Some of our authorities maintain that the plan is successful, and that most of the venereal infection is the result of clandestine prostitution. Whether the reglementation does not promote the clandestine practice, and what the effect of the whole system may be on moral conditions, I am unable to say. I consider the problem a very difficult one.

REPORT OF COMMITTEE ON NECROLOGY, 1911 AMERICAN PUBLIC HEALTH ASSOCIATION

DR. H. D. HOLTON, Chairman.

Leonard Parker Kinnicutt

LEONARD PARKER KINNICUTT became a member of this Association in 1899. Prof. Wm. T. Sedgwick, who has been associated with our distinguished fellow member, writes as follows: "Science, education and the State have each and all suffered a heavy loss in the death of Professor Leonard Parker Kinnicutt, head of the department of chemistry in the Worcester Polytechnic Institute. The passing of a prominent politician or of a millionaire often excites more comment than does the death of a quiet yet accomplished worker in the fields of science and education, and it seems to me therefore fitting that the citizens of Massachusetts should pause for a moment to recognize and mourn the loss of one who has done high and helpful service in the fields of science and scholarship.

Professor Kinnicutt's specialty was sanitary chemistry, a subject somewhat encroached upon but by no means eclipsed by the modern development of sanitary biology, and in the subject to which he had chiefly devoted his life, Dr. Kinnicutt had made himself a leader of the very first importance.

Born in Worcester in 1854 he was graduated from the course in chemistry at the Massachusetts Institute of Technology in 1875. The next four years he spent in professional studies in Germany, and during this period had the first warning of the insidious disease from which he has finally died. The writer made his acquaintance at the Johns Hopkins University in '79, where the young Kinnicutt was a pupil of Remsen. Proceeding to Harvard, the difficult degree of doctor of science was won in 1882, and here also Dr. Kinnicutt served as instructor in chemistry until made assistant professor at the Worcester Polytechnic Institute. Since 1888 he had been director of the large and important department of chemistry in the Worcester institution, where he had long been a favorite and beloved teacher whose pupils are scattered all over the country in positions requiring responsibility as well as technical skill.

Professor Kinnicutt's principal work has been done in and for the State of Massachusetts. In 1883, for example, he was admitted to membership in the American Academy of Arts and Sciences, which carries upon its rolls the leading scientific men of Massachusetts, and from 1902 to the present time he has served as chairman of one of its most important committees. He has had much to do with the New England Water Works Association, the Boston Society of Civil Engineers and the New England section of the American Chemical Society, of which section he has taken his turn as president. His name, however, is almost as well known throughout the whole United States as it is in Massachusetts, as is shown by the fact that he has been since 1903 consulting chemist to the State

Presented to the American Public Health Association, Havana, Cuba, December, 1911.

Sewerage Commission of Connecticut; has served as vice-president of the American Association for the Advancement of Science, and as associate editor of the Journal for Industrial and Engineering Chemistry. Moreover, unlike many well-known American scientific men, Professor Kinnicutt had an excellent international reputation with membership in the London Chemical Society and in the Chemical Society of Germany, and honorary membership in the Society of Managers of Sewage Disposal Works in England. He was an authority on the disposal of wastes; on the sanitation of air, water and gas; on methods of chemical analysis, and on many other branches of the huge and important subject of chemistry which he had made so much his own. His latest work, prepared in conjunction with Winslow of the Institute of Technology and Pratt of the State Board of Health of Ohio, is the latest and by far the best treatise on the subject of sewage disposal in the English language, and one which bids fair to remain a lasting monument. Shortly before his death he was chosen president of the Section of Hygiene and Sanitation of the International Congress of Applied Chemistry.

I can hardly trust myself to speak of Professor Kinnicutt's personality. This was unique, lovable and altogether charming. Kindness and friendship such as his life exemplified could not further go. He was critical, yet just; fearless, yet considerate of others; honest to a fault; a hard worker; and to a degree nowadays unusual, an accomplished and cultivated gentleman."

Uranus Owen Brackett Wingate, M. D.

URANUS OWEN BRACKETT WINGATE, M. D., became a member of this Association, 1890. He was for several years Health Commissioner of Milwaukee, and for ten years, Secretary of the Wisconsin State Board of Health; he died at his home in Milwaukee, February 19, 1911, from pneumonia, aged 62. He was born in Rochester, N. H.; enlisted in the army at the age of 16 and served throughout the Civil War. He attended three courses of lectures at Harvard Medical School, and Dartmouth Medical School, graduating from the latter institution in 1875. He practiced until 1886 in Haverhill and Wellesley, Mass., and served for five years as a member of the Medical Corps of the Massachusetts Volunteer Militia. In 1886, he moved to Milwaukee, four years later was made Health Commissioner of that city, and in 1894 was appointed Secretary of the Wisconsin State Board of Health. He was a member of the American Medical Association, the American Public Health Association, American Psychological Association, and the Milwaukee County Medical Society, of which he was once President. He was professor of diseases of the nervous system and hygiene in the Wisconsin College of Physicians and Surgeons; visiting neurologist to St. Mary's and Milwaukee County Hospitals, and consulting neurologist to St. Joseph's Hospital. He contributed many articles to medical literature on subjects connected with his specialties.

James A. Burroughs, M. D.

JAMES A. BURROUGHS, M. D., was born in Hookersville, West Virginia, December 8, 1857. He died in Asheville N. C., December 29, 1909. Dr. Burroughs graduated from the Louisville Medical College in 1882. Became a member of this Association in 1885. In the early eighties he had repeated

attacks of pulmonary hemorrhages. A year was spent in Colorado in 1883. He sought relief in the mountains of Western North Carolina, locating in Asheville. Here he improved in health and as a result of the benefit he received in this salubrious climate, he specialized in pulmonary diseases, and persons similarly affected sought relief in this mountainous region, many returning to their homes apparently cured. In 1883 he married Miss Annie E. Reynolds. Much of his success in his busy life was accomplished aided by her untiring helpfulness. He was a member of various Medical and Sanitary Societies, and the founder and President of the Tri-State Medical Association of the Carolinas and Virginias.

Willis W. Ranshaw, M. D.

WILLIS W. RANSHAW, M. D., was born in Covington, Ky., August 4, 1871, died January 18, 1911. Became a member of this Association, 1908. Dr. Ranshaw graduated from the Miami Medical College and was Assistant Physician for two years in a private Ophthalmic Hospital in Cincinnati. He was unmarried. He organized the Sanitary Department of Covington and equipped it with modern methods and appliances. His indefatigabe devotion to duty produced organic disease of the heart, which ultimately caused his death. He practised his profession in Christian faithfulness.

William Bailey, M. D.

WILLIAM BAILEY, M. D. became a member of this Association in 1879. He was one of the oldest practitioners of Louisville and President of the Kentucky State Board of Health since 1909. He died at his home in Louisville, July 15, 1911, aged 78. He was born in Bridgeport, Ky., and was graduated from the Kentucky Medical Institute near Frankfort as B. A. in 1853, and a year later the honorary degree of M. A. was conferred on him. For three years he acted as a professor of Kentucky School of Medicine from 1857 and seven years later had conferred on him the degree of M. D., by the University of Louisville. He practised in Shelbyville, Ky., until the opening of the Civil War, throughout which he served as major and surgeon with the Ninth Kentucky Volunteer Cavalry. His college work commenced in 1869. He occupied successfully chairs in the Kentucky School of Medicine, the Hospital School of Medicine, of the faculty of which he was President, and at the time of his death was the professor of materia medica and therapeutics in the University of Louisville. He was a member of the American Medical Association, President of the American Public Health Association in 1894, President of the State Medical Society and many other local Societies, of which he was a member. He was a member of the State Board of Health of Kentucky for twenty-six years and its President at the time of his death. He was also a member of the Local Board of Pension Examiners for many years. His illness commenced in December last, when he fell and sustained a fracture of the humerus. Soon after, he had a cerebral hemorrhage. He improved but a malignant growth of the mouth developed, which caused his death. Although honored by his professional confreres in every possible manner, Dr. Bailey was a man of very modest disposition; he was clean in his profession and pure in his life, was devoted to his family and beloved by all who knew him.

Herbert Milton Nash, M. D.

HERBERT MILTON NASH, M. D., a graduate of University of Virginia, 1852. He died April 20, 1911, aged 79 years. He was Corps Surgeon in the Confederate Service in the Civil War, charter member of Norfolk Medical Society, President several years of the Virginia State Medical Society. He became a member of this Association in 1878.

Mrs. Ellen H. Richards

MRS. ELLEN H. RICHARDS became a member of this Association in 1888. She was born in Dunstable, Massachusetts, December 3, 1842. She graduated from Vassar College in 1870, with the degree A. B., received A. M. in 1873 and S. B. from the Massachusetts Institute Technology the same year. She married Robert H. Richards, Professor in the Massachusetts Institute of Technology. She was instructor from 1884 to the time of her death. She was the author of many books on Foods, Right Living, Water Analysis, and Sanitation. A modest woman whom to know was an inspiration to a better life.

A. N. Bell, M. D.

A. N. BELL, M. D., one of the original founders of this Association, born August 3, 1820, in Northampton County, Virginia, died October 16, 1911, aged 91 years. A graduate from the Jefferson Medical College, Philadelphia. He received the honorary degree of A. M. from Trinity College, Hartford, Conn., in 1860. He served as Past-Assistant Surgeon in the Navy from '47 to '55 and was the first to use steam as a disinfectant in yellow fever. An active member of Quarantine conventions, Chairman of Committee on External Hygiene, which reported a system of quarantine regulations upon which the foundation of all subsequent regulations has been based. Dr. Bell was Superintendent of floating hospital for yellow fever in New York Harbor, 1861 and 1862, was the author of Quarantine Laws passed in 1863, Supervising Commander of Quarantine, New York, 1870-3, and Inspector of Quarantine, National Board of Health, 1879. During these years he had charge of efforts to exterminate yellow fever in New Orleans and Memphis. He was founder, editor and publisher of the *Sanitarian*, 1873 to 1904; member of many Medical and Sanitary Societies, both in this country and abroad, and was a voluminous writer on sanitary subjects. As a man he was a good friend, an interesting conversationalist and an indefatigable worker.

J. P. Harrel, M. D.

J. P. HARREL, M. D., became a member in 1909. He was born in Milton, Iowa, and graduated in 1892 from the Keokuk Medical College. He commenced to practise in Clayton, and subsequently removed to Burlington, where he died June 28, 1910.

Richard M. Wyckoff, M. D.

RICHARD M. WYCKOFF, M. D., became a member of this Association in 1894. Born in Brooklyn, seventy-three years ago, Dr. Wyckoff received his early education there. Later he entered Amherst College, from which he was graduated in 1859 and from Bellevue Hospital Medical College five years later. After the Civil War Dr. Wyckoff received a commission as assistant surgeon in the

United States Navy, remaining for several years, and was then retired at his own request. Shortly afterward he want back to his home town, where he took up the practise of his profession, and had been actively engaged since. Dr. Wyckoff was at one time Registrar of Vital Statistics, Assistant Sanitary Superintendent for Brooklyn, Secretary and Deputy Commissioner of the Department of Health and Deputy Commissioner of Health. For a time he served in St. Peter's Hospital. He was a member of the Kings County Society and editor of its publication, also contributing to other medical publications.

G. M. Cantrell, M. D.

G. M. CANTRELL, M. D.,, of Little Rock, Arkansas, was born in Nashville, Tenn., died July 21, 1910, in Denver, Colorado, where he had gone hoping to regain his failing health. His father was a prominent physician of Little Rock for many years. Dr. Cantrell was educated at the Kentucky Military Institute—took his medical degree from the Vanderbilt University, married Mrs. Corrinne B. Colton, of Georgia, moving to Little Rock in 1886. He soon took a prominent position in the Professional and Civic life of the city, was a member of the City Council, City Physician, subsequently Physician to Arkansas State Penitentiary, also was President of the State Board of Health, was Vice-President and Professor in the College of Physicians and Surgeons of that city. He became a member of this Association in 1902.

James M. Morgan, M. D.

JAMES M. MORGAN, M. D., became a member of the Association in 1905. He was born in 1858 and died in Augusta, Georgia, on April 23, 1911. He was for many years President of the Board of Health of Augusta, and his administration of this high and important trust was distinguished by high professional skill and a display of unusual enthusiasm, industry and ability. He was a professor in his alma mater, the Medical College of the University of Georgia.

Walter Wyman, M. D.

SURGEON-GENERAL WALTER WYMAN died November 21, 1911. An obituary notice appeared in the JOURNAL, December, 1911.

BOOK REVIEWS

Microbiology for Agricultural and Domestic Students. *Edited by Charles E. Marshall. Philadelphia, P. Blakiston's Sons Co.*, 1911.

The appearance of this work marks a new and worthy departure in the method of compilation of text-books for purposes of technical education. For here is fully emphasized, in a unique manner, the academic viewpoint that recognizes the necessity and value of as broad a presentation as possible of the whole science of which the specialty forms only a part.

Leaving out of consideration translations of more ambitious foreign publications, this volume easily outranks, in the English language, anything of its sort with which the reviewer is acquainted. And the raggedness so frequently observed in collaborative writings has been overcome in a remarkably successful manner, giving to the work a smoothness of design and expression of subject matter that makes it attractive in the highest degree.

Bearing in mind the old Biblical saying, that "none is perfect; no, not one," attention may be called to certain points upon which there might be based some legitimate criticism.

There are, of course, the inevitable misprints here and there that, despite the finest-meshed sieve of the proofreader, have slipped through unobserved.

But one outstanding error in uniformity that should be corrected in a forthcoming edition is the very general omission in many of the divisional chapters of either a list of chief works of consultation or direct bibliographic references to some at least of the more important issues treated of. One should not undervalue, in spite of the plea of added bulkiness, the immense stimulus and satisfaction coming to the reader from the insertion of such references; they constitute an educational factor in the training of the student that acts as an incentive to the cultivation of a proper scholarly inquisitiveness.

Certain omissions strike the eye in some places. In speaking upon the "germicidal action of milk" (p. 322) the writer has ignored in this connection, the very interesting observations of Rosenau and McCoy upon the presence of certain agglutinins in milk that may go far to explain this so-called germicidal action; and also the confirmatory report of Heinemann and Glenn.

Discussing pasteurization of milk (p. 320), conspicuous by its absence stands out any reference to the experiments of Ayers and Johnson, in which it is shown that in commercial pasteurization of milk lactic acid organisms actually survive the process, and such milk does not "putrefy" but goes on to normal souring.

In the section on animal diseases no mention is made of the occurrence of "milk sickness" in stock and its cause, although papers bearing upon its appearance and cause have been given wide prominence recently.

Absurdities of composition and statement are found here and there, as for instance (p. 333), speaking of the recognition of bacterial forms in milk smears: "With sufficient experience one can recognize streptococci, B. subtilis, organisms of the B. coli type, and some of the putrefactive species. . . . The weakness of this method lies in the fact that it is not always possible to recognize the above types of organisms." Then why recommend it? And, referring to infectious diseases of unknown origin (p. 522), the use of the term "symbiosis" is not by any means allowable, if we accept as correct (and rightly so) the definition as given on page 181. And if "symbiotic relationship of infectious organisms is probably not the logical explanation for infections of this character" then why mention it?

On page 546, paragraph two, and on page 547, last paragrapn, we find repeated in all its vigor that ancient statement of the value (!) as barriers against the entrance of bacteria to the nasal passages and conjunctival sac of the relatively few bristly hairs in and about those wide-open regions.

On account of loose composition one must infer (p. 609, paragraph four) that avian diphtheria has the same common causative factor as human diphtheria.

In the last paragraph, page 621, B. cholerae suis is erroneously included in the Pasteurelloses.

Referring to the means of communication of plague (p. 626, paragraph four) the writer reverses the usually accepted order

of importance of the flea in relation to the infected rat and the infected human.

Probably the printer's devil is responsible for the novel conception of "dirt-carrying micro-organisms," to be found on page 547, line five from the bottom.

One cannot help noticing the plasticity of our mother tongue in such eccentric usages as "is lacked" (p. viii., introduction, line fourteen from foot), "monographed" (p. 605, line nine from foot), and "infectee" (p. 692, line eighteen from foot).

Despite shortcomings, one cannot but appreciate the great labor involved in the production of the book and admire the success attained in presenting so clearly the main facts in so relatively small a compass. Both editor and collaborators are to be congratulated upon their efforts.

The volume is neatly bound, and well set up and illustrated.

NORMAN MACL. HARRIS.
The University of Chicago.

A Text-Book of Meat Hygiene. With Special Consideration of Ante-Mortem and Post-Mortem Inspection of Food-Producing Animals. *By Richard Edelmann, Ph.D., Medical Counsellor; Royal State Veterinarian of Saxony; Professor at the Royal Veterinary High School in Dresden. Authorized Translation Revised for America, by John R. Mohler, A.M., V.M.D., Chief, Pathological Division, U. S. Bureau of Animal Industry, and Adolph Eichhorn, D.V.S., Senior Bacteriologist, Pathological Division, U. S. Bureau of Animal Industry. Octavo, 392 pages, with 152 illustrations; and 5 colored plates. Cloth, $4.50, net. Lea & Febiger, Publishers, Philadelphia and New York, 1911.*

Edelmann's book occupies a distinct niche in the structure which houses the sanitary sciences. The translation is clear and well englished. The book is, in fact, more than a mere translation, for Mohler and Eichhorn have added the American laws and regulations of the Bureau of Animal Industry, Department of Agriculture, and have also added illuminating data from their large experience. A greater variety of infections are transmitted to man through meat than any other single food-stuff, and next to milk, meat is responsible for more sickness and death than any other single article of food. Fortunately much of the danger is neutralized by cooking, canning, pickling, smoking and other methods of preservation. The importance of meat to the public health is recognized by all enlightened governments. In this respect the United States takes a high rank, for in 1906 an act was passed providing for the inspection of all meat entering interstate commerce; and for the purpose of obtaining a more satisfactory and safe meat supply for the people, a continuing appropriation of three million dollars is appropriated yearly. This sum is sufficient to cover the country with a corps of trained inspectors armed with ample power. The book before us deals mainly with the problems of meat inspection, but as the main object of meat inspection is protection of the public health, the volume is not inappropriately called "Meat Hygiene." Throughout the book the practical needs of the inspectors of meat have been borne in mind by the translators. Chapter I. deals with food animals, their classification and methods of slaughter. A description of the muscles and organs used for food, including beef, veal, mutton, goat meat, pork, horse meat, dog, rabbit, poultry, and meat of game, as well as fish, crustaceans, mollusks, and amphibia are discussed in chapter II. Modern methods such as the precipitin tests for distinguishing fraudulent substitutions, and the recognition of meat from different species is fully described. The various methods of production, preparation and conservation of meat are considered. In chapter IV. the regulations governing meat inspection of the United States Department of Agriculture are inserted bodily. These regulations are in themselves an authoritative text book upon the subject. The chapter upon abnormal conditions and diseases of food-producing animals is a condensed statement of the pathologic anatomy of the lesions with which every meat inspector should be familiar. Chapter VIII. deals with the infectious diseases of food animals transmissible to man, and a chapter has been added upon meat poisoning, in which proper emphasis has been placed upon micro-organisms belonging to

the group of the *Bacillus enteriditis*. In this chapter we should like to find more concerning paratyphoid and the method by which these infections get into the meat, and their effects upon man. There is much to commend and little to criticise in the book. It is well printed upon good paper and handsomely illustrated. The volume will serve as a convenient and authoritative guide to inspectors, as well as an admirable text book and work of reference for students and veterinarians.

M. J. ROSENAU.

PUBLIC HEALTH NOTES

Health Activities of the American Association for Labor Legislation

Since its organization six years ago as the American section of the International Association for Labor Legislation, the American Association has given special attention to the subject of industrial hygiene. Under its auspices the First National Conference on Industrial Hygiene ever held in the United States was brought together in Chicago in June, 1909. One of the outgrowths of this Conference was the creation of the Illinois Commission on Industrial Diseases, and its valuable report on lead poisoning and other industrial poisonings resulting from industries carried on in the State. Encouraged by the example of European governments in prohibiting the manufacture of white or yellow (poisonous) phosphorus matches, the Association caused a bill to be introduced in Congress to accomplish the same result in the United States through a prohibitive tax. The Esch Bill, in which form this proposal has been before two successive Congresses, gave place recently to the Hughes Bill, an almost identical statute, which on March 5th was favorably reported by the Ways and Means Committee and has good prospect of becoming a law.

Another activity of the Association has been the promotion of bills requiring physicians to report industrial diseases, a requirement unknown in the United States until last year. Six States have now passed such laws, and there is good prospect that their example will be followed generally throughout the United States. Within a few months after the New York law took effect over one hundred cases of death from industrial poisonings had been reported to the New York Department of Labor. Sixty of these were cases of death through lead poisoning alone. To bring to bear on the problem of industrial hygiene the expert intelligence needed to effect real reform, the New York Association for Labor Legislation, a branch of the American Association, has organized a Committee on Industrial Diseases made up of representative New York physicians, sanitarians, chemists, actuaries and students of labor legislation. This committee has prepared record cards for the reporting of industrial diseases, a leaflet proposing an exact nomenclature of occupations and the diseases resulting from them, and other useful material, which is being published and widely distributed through the Department of Labor. With the co-operation of this committee, the American Association is arranging a program for a second National Conference on Industrial Hygiene, which will be held at Atlantic City on June 3d, 4th and 5th.

HENRY R. SEAGER,
President American Association for Labor Legislation.

Health Motion Pictures

"Motion Pictures Dealing with Health Subjects" is the title of a new pamphlet which the National Association for the Study and Prevention of Tuberculosis has just prepared. The pamphlet describes eleven films, each of which deals with some phase of the health problem. "The Red Cross Seal" and "The Awakening of John Bond" deal with tuberculosis and its prevention; "The Man who Learned," with the dangers of impure milk; "The Fly Pest," with the house fly; "The Wedding Bell," with the danger from sweatshop goods; "A Sane Fourth of July," with the "old-fashioned" and "new" method of celebrating Independence Day; "The Little Cripple," with conditions that produce juvenile deformity; "At the Threshold of Life," with the need for kindergartens; "The Visiting Nurse," with the work of a nursing association; "Summer Babies," with the care and neglect of babies in hot weather; and "Boil Your Water," with diseases that may come from impure water.

The circular gives, besides an outline of each picture, the price at which it may be obtained, and where, and also the manner in which the films may be rented, with a list of licensed exchanges. Copies of the pamphlet may be had upon request from the American Journal of Public Health, 289 Fourth Avenue, New York.

A Home Hospital Plan

What promises to be a most interesting and valuable experiment in home treatment of tuberculosis has been inaugurated by the

New York Association for Improving the Condition of the Poor. The Association has leased for three years a section of the East River Homes, and in these model apartments will house twenty-three families, in which one or more members are consumptives, every facility for strict sanitary and hygienic supervision being provided. The experiment is being designated as a "Home Hospital for Tuberculosis."

The objects of the plan are threefold: (1) To prevent the spread of tuberculosis from the sick to the well members of the family and particularly to protect the children from infection; (2) to cure as many as possible of those in the early stages; (3) to afford considerable improvement to persons whose cases are only moderately advanced.

Of the twenty-three families selected for the experiment, two families each have two tuberculous patients; two each have three patients, and nineteen each have one patient. In all there are twenty-two adults and seven children who have tuberculosis. Only those families will be allowed to remain who co-operate willingly in the plan. Every precaution that is provided in a well regulated hospital or sanatorium will be attempted at the Home Hospital. Advanced cases will be segregated and will be rigidly supervised so that they do not further infect other members of the family. Facilities for outdoor treatment for incipient cases will be provided on the roof, overlooking John Jay Park and the East River. An open air school on the roof will also be established for children of school age in the twenty-three families.

The resident staff will consist of a supervising nurse, who will have full control of the home; another nurse; a housekeeper and cook; a visiting housewife to instruct the families in household economics, and other helpers and assistants. The entire work will be carried on under strict and careful medical supervision.

It is estimated that the cost of the experiment will be $23,480 a year net, and excluding the possible earnings of the able-bodied members of the families. This includes not only relief, but also all medical care and oversight.

This experiment is different from that which the New York Charity Organization Society tried four years ago and abandoned because it was not successful, in that the present plan contemplates both continuous supervision of patients and sanitary, especially adapted housing conditions.

An Epidemic of "Septic Sore Throat"

Septic sore throat, a peculiar and virulent type of tonsilitis, has made its appearance in this country in epidemic proportions. The disease, which is characterized by deep abscesses and serious complications of a septic nature—such as rheumatism, pericarditis, erysipelas, peritonitis and pneumonia—is well recognized in England, and epidemics of it have been frequently traced there to infected milk supplies. An epidemic of some 1400 cases occurring in eastern Massachusetts in May, 1911, has been investigated and reported by Professor C.-E. A. Winslow. This epidemic apparently marks the appearance of a new problem for American health officers.

In the Massachusetts outbreak approximately 1000 of the cases centered around Boston, were clearly localized to certain well-to-do districts, and to the customers of a single dealer. The epidemic was of the explosive nature characteristic of those borne by milk. The remaining 400 cases occurred in Hudson, Marlboro and Southboro, adjacent towns about twenty-five miles out of Boston, were prosodemic in character, and antedated the Boston cases. A large part of the milk distributed by the dealer in question was produced in Southboro, and the evidence is strong that the earlier rural epidemic gave rise to the later urban one. The vehicle of disease in this case was a milk supply thoroughly and scientifically inspected and controlled, and it is difficult to see how the epidemic, resulting in forty-eight deaths and a vast amount of serious sickness, could have been prevented by any additional safeguards other than pasteurization. Aside from being a strong argument for pasteurization, the epidemic suggests the advisability of making tonsilitis a reportable disease. The investigation was admirably planned and carried out and will repay a most careful perusal by sanitarians.—*Journal Infectious Diseases*, X, 1, Jan., 1912.

Covered Milk Pails

The following interesting editorial is taken from the first number of the *Clean Milk Bulletin*, published by Dr. Charles E. North of New York.

"Work which has been carried on at Homer, N. Y., for the past two years by the New York Dairy Demonstration Company under the writer's personal direction, has positively proven that the use of covered milking pails, together with the cooling of milk with ice, are two factors in clean milk production of such great importance that all other measures look small beside them. The many thousands of bacteriological tests which have been made at Homer show conclusively that the bacteria in the milk of any dairy farmer can be reduced from millions to below ten thousand, and even to a few hundreds, by the use of covered milking pails and ice. The one weak spot at the present time in the milk business is the character of the milk which the average dairy farmer brings to the shipping station. The majority of the large milk companies handle the product after it comes into their possession in practically a perfect manner. Pasteurization is becoming an exact science, but we cannot be satisfied with milk as a commodity until its character as delivered to the shipping station is of the best. There is at the present time a movement on foot among a number of the largest dealers in this country to equip their dairy farmers with covered milking pails. It is interesting to note that the city of Cincinnati has recently passed an ordinance compelling the use of covered milking pails on the part of all of the dairy farmers producing milk for that city. The files at the Patent Office show that there are somewhat over two hundred different milking pails with covers which have been invented. Some of these have been on the market for more than thirty years. There are at least a dozen different types which are simple and efficient. It is the writer's opinion that there is no one measure which will do so much to improve the general character of milk as the adoption of some good covered milking pail."

Incidentally it may be stated that this new publication is an admirable one and should find its way into the hands of all persons connected with the production, transportation, distribution and supervision of milk.

New Jersey's Health Officers' Association

This Association, although a very young one, is already of considerable importance in the advancement of modern sanitary ideas in New Jersey. Meetings are frequently held, and in this way the health officers and sanitary inspectors from all over the State are brought together. The lack of satisfactory legislation is a point that is especially emphasized by the interchange of experiences of the health officers, and as a result the Association, through its Executive Committee, has had a number of bills prepared and presented to the State Legislature. An active program to assist in the passage of the proposed legislation is also a part of the duties of the Executive Committee.

Other States might well take a lesson from New Jersey in this matter.

French Vital Statistics

Last year France again lost in its native population. In the first six months the deaths, 404,278, exceeded the births by 18,279. The year before there was an excess of 21,189 births.

As the second six months, for which the figures are not yet complete, includes the months of greatest heat, it is assumed that the whole year shows a loss, although, of course, this is more than made up by immigration from other countries.

The worst half year on record was the first half year of 1909, when there was an excess of 28,203 deaths. But this was because of unusual mortality, for even then there were more births than in the corresponding period in 1911.

Typhus Fever and the Head Louse

Following along the lines of their recent investigation on the identity of typhus fever and Brill's disease, Drs. Joseph Goldberger and John F. Anderson, of the Public Health and Marine Hospital Service, present their preliminary report on the modes of transmission of the disease. Other investigators in this field, Nicolle, Comte and Conseil (1909) and Ricketts and Wilder (1910) have successfully demonstrated the insect transmission of typhus fever by means of the bite of the body louse. Drs. Goldberger and Anderson independently verified these results and in addition turned their attention to infection by the common head louse. In their subsequent experiments on the monkey with lice obtained from hair clipped from typhus patients in Mexican hospitals they succeeded in fixing the head louse as intermediary in the transmission of typhus fever. They outline their procedure as follows:

(A) In an attempt to transmit typhus fever (Mexican virus) from man to monkey by subcutaneous injection of a saline suspension of crushed head lice, the monkey developed a typical febrile reaction with subsequent resistance to an inoculation of virulent typhus (Mexican) blood.

(B) In one of three experiments to transmit typhus fever (Mexican) from man to monkey by means of the bite of the head louse, the animal bitten by the presumably infected head lice proved resistant to two successive immunity tests with virulent typhus blood.

They confirm the observations of other investigators in their lice experiments on monkeys, *i. e.*, that as a rule infection by means of a louse bite or subcutaneous injection of ground lice was not accompanied by any very marked temperature reaction, but was proved only after incubation by immunity tests with virulent blood.

They conclude:

1. The body louse may become infected with typhus. The virus is contained in the body of the infected louse and is transmissible by subcutaneous injection of the crushed insect or by its bite.

2. The head louse may become infected with typhus. The virus is contained in the body of the infected louse and may be transmitted by subcutaneous injection of the crushed insect, and, we believe, also by its bite.—(March 1, 1912, Public Health Reports.)

Plague Conference Report

The Bureau of Science of Manila announces the publication of the International Plague Conference, which was held in Mukden in April, 1911.

The epidemic of pneumonic plague which raged in Manchuria and Northern China during the winter months of 1910-11 caused the death of nearly 50,000 people. No epidemic of this magnitude and nature has occurred in modern times, and as the knowledge concerning epidemic pneumonic plague has been meagre, the study of the Manchurian epidemic in all of its features was one of particular importance.

When the epidemic assumed alarming proportions, the Chinese Government, actuated by the highest motives of humanity, invited the eleven foreign Powers represented at Pekin to send specialists to attend an International Plague Conference for the purpose of throwing further light upon the nature of the disease and to give advice regarding methods for its prevention. This Conference was held at Mukden, one of the larger cities which suffered severely from the disease.

Economy and Efficiency in Public Health Work

"Suggestions With a View to Increased Efficiency and Economy in Public Health Work" is the subject of a paper delivered before a recent meeting of the North-Western Branch of the Society of Medical Officers of Health by Francis Vacher. Mr. Vacher is the late medical officer of health of Cheshire, and began his public health work in 1873, or two years before the enactment of the at-present-operating Public Health Act. Consequently his opinions, though naturally dealing to a certain extent with local English problems, are of general interest. His suggestions may be summed up as follows:

1. That the time has arrived for the consideration and passage of a new Public Health Act.

2. That the time has arrived for giving all Medical Officers of Health security of tenure.

3. That the time has arrived for insuring that every Medical Officer of Health has a retiring allowance.

4. That Section 2 of the Vaccination Act, 1898, be repealed as soon as possible.

5. That repeated vaccination be made compulsory.

6. That measles and chicken-pox should be added to the infectious diseases which must be notified.

7. That the theory that small-pox infection may be distributed by the air for any considerable distance is a theory which should be no longer maintained.

8. That cancer should be added to the diseases which must be notified.

9. That more systematic and thorough meat inspection should be insured.

10. That the modern practice of giving powers of control to 2 or 3 Local Authorities, re milk production or otherwise, should be used with great caution, as it may prove exceedingly inconvenient and embarrassing.

Suggestions 1, 2 and 3 have to do with conditions of more or less exclusively English interest, but suggestions 4, 5 and 7 bring us in touch with problems of our own,

dealing with the control of small-pox, and the danger of the anti-vaccinationist. In advocating the repeal of Section 2 of the Vaccination Act of 1898 Mr. Vacher would do away with the exemption of the "conscientious objector," and for justification points to the disastrous results of this section as evidenced by the continued existence of preventable epidemics. The notification of measles and chicken-pox is desired because of their simulation of small-pox; that of cancer for a better understanding of the disease. American health officers will be interested in this paper not only for the inherent worth of the suggestions, but also for comparison with recent endeavors toward economy and efficiency in public health work in their own country.

(Public Health, XXV, 6, Mar., 1912.)

Factors in the Control of Diphtheria

Health officers and epidemiologists will find much of value in a paper entitled "Some Experiences in Connection With Epidemic Diphtheria," by Dr. A. E. Porter, medical officer of health of Reigate, England. Taking hold of his district (population about 27,000) in 1906, this officer was confronted with an unusual and persistent amount of diphtheria. Cases of so-called sore throat, not serious enough to require medical treatment, were found to antedate small outbreaks in certain schools, and bacteriological examinations of the throats of such cases usually revealed the presence of the diphtheria bacillus. A system of prompt enquiries into the causes of absence from school followed by investigation of suspicious cases was inaugurated to meet this condition. Chronic nasal diphtheria with an entire absence of faucial symptoms proved to be another important source of infection. Scarlet fever patients also yielded interesting results. At one time during an epidemic of scarlet fever, examinations were made of hospital cases showing no sign of clinical diphtheria; 5 out of 29 showed the Klebs-Löffler bacillus. The already discharged cases were then looked up, and in 10 out of 41 the infection was present.

Upon applying the obvious remedies for these conditions Dr. Porter was gratified to see a marked decline in the incidence of diphtheria in his district. Scientific control did away with a practically endemic condition, and brought the diphtheria mortality rate in the last three years to a point lower than had been reached since 1876. Dr. Porter at the same time points out that as long as large urban centers exist near-by it will be impossible to prevent epidemics due to imported cases. In combatting such outbreaks, and in the control of their after-effects he is a thorough believer in bacteriological methods. This piece of work is an example of what can be done in a city of this size, and is interesting because of the emphasis laid on carrier cases, especially as affecting the nose and in scarlet fever.

(Public Health, XXV, 6.)

Typhoid Epidemic at Cedar Falls, Iowa.

Cedar Falls, Iowa, was, in November and December of 1911, the scene of a sharp epidemic of typhoid fever. In a population of about 6,000 there occurred 150 cases, resulting in 16 deaths. Interesting epidemiological studies conducted by A. L. Glover of the Iowa State Board of Health and R. B. Dole of the U. S. Geological Survey indicate that the outbreak was due to the city-water supply. The age grouping of the cases, and their equal distribution upon the routes of the different milk dealers eliminated milk as a possible source of infection. In a similar manner ice-cream, butter, fruit, fresh vegetables, and oysters were proven innocent.

The Cedar Falls water is obtained from certain limestone springs situated on the banks of a watercourse close to the polluted Cedar River. The springs in question are extremely free-flowing in character, and come to the surface at one of the lowest points in the district. The water appears to come from well defined rock channels which carry it quickly from points in the drainage area to the springs, in some cases without sufficient natural filtration. Altogether ample possibility and probability were shown for the pollution of the supply. When, therefore, the recent outbreak came two weeks after a period of excessive rain and high water, and with the rest of the epidemiological evidence as stated, there could be little doubt as to the vehicle of the disease.

The outbreak is interesting as another example of a clear-cut water-borne epidemic, and as showing the danger attending the use of such supplies—usually pure, but occasionally polluted. The weakness of laboratory tests alone is again shown. Chemical analyses in the past have given this

water a clean bill, and bacteriological examinations made after the onset of the epidemic failed to indicate any considerable pollution. The water is now being disinfected with bleaching powder, and the people have been instructed to boil their drinking water. It has been recommended that the city sewerage system be extended, and that a new water supply be obtained, either from deeper wells or by filtering the Cedar River water.

(Eng. News, Vol. 67, No. 12.)

Infantile Paralysis in England

The Local Government Board has just issued a special report on epidemic poliomyelitis. (New Series, No. 61.)

Papers are presented by Dr. R. J. Reece, Dr. Reginald Farrar, Dr. Mervyn Gordon and Dr. Hugh A. Macewen.

The report is a full one (151 pages) and contains reviews of the experimental work done on poliomyelitis and of the literature dealing with its epidemiology and clinical character. It should be in the hands of all students of this disease.

Epidemic of Typhoid in Coatesville, Penn.

A severe epidemic of typhoid fever has recently broken out in Coatesville, Penn., a small town drawing its water supply from two streams, Sucker Run and Heffner Creek. As early as August 1, 1910, and again on December 15, 1911, State Health Commissioner Dixon condemned this source of water supply, declaring in the first instance that "the danger of an epidemic of water-borne disease, notably typhoid fever, is very grave," and later, the water to be unfit for consumption. He ordered the immediate installation of a hypochlorite sterilizing apparatus at the waterworks intakes and a submittal of plans for a filtration plant for approval by the State Board of Health. The Waterworks Commissioners, heedless of this order and now confronted with the problem of deficient water supply, secured an increase of the latter by tapping a small stream situated below a hospital harboring typhoid patients. This was done without written permit from the Health Commissioner, thereby violating the "Pure Water Act" of 1905. The last move was followed by an outbreak of typhoid fever, with 200 cases and 2 deaths reported up to February 20, 1912. Dr. Dixon immediately installed a sterilizing plant and has from latest reports full control of the situation.

This sad experience is not to be looked upon merely as a supporting link in our hypothesis, strengthened by our study of a half century, *i. e.*, that typhoid is a water-borne disease and that the typhoid rate is the automatic register of the sanitary quality of a water supply. It should, however, serve to bring out forcibly the laxity in waterworks operation, and more strongly, the lack of uniformity in local and State Health rulings and the absence of co-operation between the local and State boards of health.

(Abstract of Editorial, Eng. Record, March 9, 1912.)

Tropical Diseases

To the student of tropical diseases a recent English Blue Book entitled a Report of the Advisory Committee for the Tropical Diseases Research Fund (Cd. 6024, 1912) will prove both interesting and valuable. This volume contains both the reports of the four Laboratories located in England which are making investigations on tropical diseases and those of Colonial Laboratories. Much information is given concerning yaws, pellagra, beri-beri, dengue, Oriental sore, sleeping sickness, etc.

Mongoose Versus Snakes

In order to control a poisonous snake of very deadly character in St. Lucia (Windward Islands) mongoose were imported, as these animals are a natural enemy of the snakes. Dr. Lucius Nicholls in a recent report * gives some interesting facts concerning the outcome. He states that at first the mongoose had no natural enemies and with an abundant food supply multiplied very rapidly and destroyed all of the snakes in and around towns, villages and settlements. However, it has been a mixed blessing, as it has practically exterminated several birds that nest on the ground, harmless snakes which were of value as rat destroyers, "and has greatly diminished those good destroyers of insects—the lizards; besides, it has devoured innumerable rats, until that wily creature altered its methods of living and made nests in the trees, and spent the night hunting for food, for the mongoose hunts by day."

*Report of Advisory Committee for the Tropical Diseases Research Fund.

This vast amount of food being lost or lessened, and that which remains having no doubt learnt to keep one eye on the mongoose, this little animal has naturally started to diminish; and it will continue to do so until some balance is reached between itself and its food supply. With the ebb of the mongoose there is the flow of the serpent."

Dr. Nicholls points out that when this balance is established between the mongoose and the snake, the latter "will never again become the terrible pest he was." . . .

The necessity for great care to be taken before an animal is introduced into a new country is indicated by Dr. Nicholls. The entire possibilities of breeding and destruction which may result should be most carefully considered. Dire results have occurred through the introduction of some form of plant or animal life by irresponsible persons. "It is time, indeed, that this matter were controlled by law."

Tricks of the Trade

"In an address to the Carlisle Microscopical Society last week, Dr. F. H. Morison (C.M.O., Cumberland) alluded to the tricks of meat fakers. He recalled the story of the butcher in the country village who sent word to his customers that he would have pork on a certain day. When the day arrived and the pork was not forthcoming, the messenger was asked why, and he said, "Oh, the pig got better." Most of them had known instances where an animal had, as an Irishman would say, been killed to save its life; that was when an animal which was fattening for the market fell ill, it was slaughtered and sent into the district as good butcher's meat. Such things were well known in every district where meat inspection was properly carried out. Referring to the 3 per cent. fat standard for milk, Dr. Morison said that in prosecutions they sometimes found that an appeal was made to the cow. They knew of a case in which this was done and the appeal was successful, a cow in the vendor's byre actually yielding milk with a less percentage of fat than three. In other prosecutions which followed in the same district similar appeals were made, and the inspector was surprised to find that the same cow to which the appeal had been made in the first instance had been borrowed by the others for the occasion."

Medical Officer (London), February 24, 1912.

Rocky Mountain Spotted Fever, Rodents and Ticks

Farmers' Bulletin 484 (U. S. Department of Agriculture) deals with the relation of some of the common mammals of Western Montana to agriculture and Rocky Mountain spotted fever. The Bulletin has been prepared by Clarence Birdseye, Assistant, Bureau of Biological Survey, and is a splendid exposition of the serious depredations of ground squirrels, chipmunks, woodchucks, mice, rats, gophers and rabbits on agriculture and the serious relation between these animals and spotted fever. This disease is communicated by the bites of the spotted fever tick (Dermacentor venustus) and these ticks during their two younger stages live on small rodents and during their adult stage on domestic animals.

The methods to be used in destroying the offending animals are discussed and the bulletin is exceedingly well illustrated. Mr. Birdseye summarizes his study as follows:

"Spotted fever is communicated from wild animals to human beings by the bite of infected wood ticks.

"The most feasible ways of controlling the fever are: (1) To educate the inhabitants of infested localities in a belief in the 'tick theory'; (2) to lessen the number of wood ticks by (a) keeping domestic stock, the principal hosts of the adult ticks, tick free, and (b) lessening the number of native rodents, the necessary hosts of the younger states of the ticks; and (3) to destroy those native rodents which may serve as a source of continued reinfection of the ticks.

"The destruction of harmful rodents in certain fever-infested parts of Western Montana is doubly worth while, for there they not only are very destructive to crops, but are partly—probably fundamentally—responsible for the occurrence of the disease. Co-operation by all landowners in a district is essential to the success of any extensive campaign of rodent destruction. Poisons should be prepared in bulk by State experiment stations, counties, chambers of commerce, farmers' unions, or other organizations, and then distributed at cost to individuals. By the adoption of these commonsense and comparatively simple methods there is every reason to believe that within a few years spotted fever in Montana will be practically a thing of the past."

The Massachusetts State Healt Inspectors

A pamphlet by the State Board of Health of Massachusetts entitled "State Inspectors of Health of Massachusetts, Who They Are and What They Do," has recently been issued. Besides being of a great value to the citizens of the State, the pamphlet is of general interest as it tells of the unique organization of this State Board of Health. Massachusetts is divided into fourteen sanitary districts, each of which is in charge of a sanitary inspector. Their powers and duties are the gathering of information concerning "all influences that are or may be dangerous to the public health and keeping a close watch on all communicable diseases." The inspectors also keep the State Board of Health informed with regard to the enforcement of the laws relating to the maintenance of isolation hospitals, tuberculosis hospitals and dispensaries. One of the most important functions is to study the effects of occupation on health by considering "the existence of occupational diseases in industrial establishments." A study of the complete reports of the district inspectors with regard to their work along the lines of Industrial Hygiene is well worth while to anyone who desires to keep posted on some of the most progressive work being accomplished in this direction.

Dr. Wm. C. Hanson, the assistant to the Secretary of the State Board of Health, has specialized in this important field and much credit is due both him and the districts inspectors in eradicating many existing evils in factories and workshops. The following progressive recommendation contained in the last annual report of the work of the district inspectors is of particular interest:

"In order that occupational diseases shall be reported, it is recommended that the present law requiring the State Board of Health to authorize and define what diseases shall be deemed to be "dangerous to the public health" be so amended as to include such occupational diseases or definite symptoms of disease due to occupational processes or conditions, as the State Board of Health may from time to time deem necessary."

The lack of proper statistics of morbidity and mortality of the various dangerous industries has been one of the most serious deficiencies in this country and it is greatly to be hoped that the recommendation may shortly become a law.

The district inspectors coöperate with local Boards of Health in many ways and help to stimulate backward towns to adopt proper measures to protect the public health. Sweat shops, mercantile establishments, police stations, prisons and slaughter houses are all inspected by the local representatives of the State Board of Health.

In a general way it may be said that the district inspectors are of distinct aid to local health authorities and perform a very useful function in the State.

The Dangerous Typhoid Carrier

Readers of these notes for January may recall an outbreak of typhoid fever in New York reported by Drs. Bolduan and Noble in which they demonstrated that a typhoid carrier in Camden, N. Y., was the source of the disease. Still another such outbreak is recorded by these investigators in a recent number of the New York Medical Journal. On one day in February, 1910, nine cases of typhoid were reported in a small district in New York, six further cases were reported on the following day and for several weeks new cases were brought to light each day.

By a process of elimination, milk was found to be the one common factor (excepting the municipal water supply, of course) in the majority of the cases. Investigation of the supply revealed the fact that at one of the creameries where the milk came from, six cases of typhoid fever "had suddenly appeared practically simultaneously with the cases being studied in New York." These six cases were found to have occurred in the households of employees of the creamery, all of whom obtained their milk from the creamery.

Forty-five dairies supplied this creamery and a thorough study was made of these, with the result of the discovery of a farmer "who gave a history of 6 cases of typhoid fever on his farm in 1904, one case in 1907 and one case in 1908."

Enormous numbers of typhoid bacilli were found in the stools of the farmer.

Conditions in general were found to be satisfactory on the farm, but the authors point out, and with truth, that at times even with the cleanest milk producer, a certain combination of things will lead to the infection of the milk. The difficulties of

combatting in New York typhoid from such carriers except by efficient pasteurization is well summed up by the authors as follows:

"The dairies shipping milk to this city number more than 40,000, and the number of persons engaged in handling the milk must be nearly 200,000. It is manifestly impossible to examine the excreta of this large number of individuals in order to discover typhoid bacillus carriers. Some advance will be made when every person who has been known to have had typhoid fever and who is engaged in producing or handling milk must undergo the necessary bacteriological examinations in order to prove that he is not a bacillus carrier. In engaging dairy and creamery help, or other persons coming into contact with milk sold to the public, inquiry concerning a previous history of typhoid fever should be made and action taken accordingly. It may be found feasible to enforce some such requirements for the exclusion of bacillus carriers from the dairy industry in the case of the better grades of milk, those selling at retail for 12 cents a quart and more. So far as the ordinary milk is concerned, however, and this constitutes the bulk of the milk sold in this city, it seems impossible to guard against this form of infection in any other way than by efficient pasteurization."

An account of a second outbreak of a similar nature has just been published in Dr. Carnwath's Report to the Local Government Board upon an outbreak of typhoid fever at Oakenshaw, England. (New Series, No. 59.) In this epidemic 74 cases occurred. It was demonstrated that the woman who washed the milk vessels was a typhoid carrier. The evidence in this case leads Dr. Carnwath to believe that the woman had been a carrier for a number of years. He asks the question why she did not give rise to an epidemic prior to the recorded one and suggests that it may be explained by the known "intermittency of the carrier" or by an increased potency for infection acquired by the woman. With regard to this latter hypothesis, it is noted that the son of the woman had a sickness which was probably a mild attack of typhoid the year before the general outbreak, and it is suggested that "it may perhaps be that he received the infection from his mother." She nursed him and "it is just possible that at this time Mrs. X. (*i. e.*, the mother) became reinfected . . . . with a fresh typhoid bacillus from the patient—with her own bacillus, perhaps rendered more virulent, by passage through the susceptible body of her son."

A Comparison

The following forceful statements are taken from the editorial pages of the April issue of Life and Health:

"A health official from one of the Southern States attended the meeting of the American Public Health Association in Havana, and returned a wiser man, but he was heartily ashamed,—ashamed for his own city, his own State, his own nation.

"What had he learned? He already knew that an American, Colonel Gorgas, had gone to Havana in 1900, and taught the Cubans the value of sanitation. What amazed him was the intelligence and energy displayed by the Cubans in putting this knowledge into practise. Instead of an island infested with mosquitoes and flies, as one has a right to expect in the tropics, he found these insects practically driven out! Fly-screens are not used on the houses, because they are not needed.

"What is the secret?—The Havanese have taken seriously the proposition that the protection of the health of the people is an important function of the government, and that a low death-rate is a valuable commercial asset, and they began their government with a national department of health. The patent-medicine fakers were not in evidence when the constitution was formed.

"Cuba pays annually 46 cents per capita on her national health. Does any American State or American city or the entire government of the United States pay as much? Since the beginning of the new order of things the death-rate of Cuba has dropped from 17.35 per thousand to 13 per thousand, which means a saving on the island of 9,570 lives a year, or more than 25 a day. If the death-rate of the United States could be reduced to 13 per thousand, and it *could* if we went about it as earnestly as the Cubans are doing, for our climate is at least as good as that of tropical Cuba,—it would mean a saving of 180,000 lives a year, or 500 lives a day!

"We pose as one of the great civilizing nations of the world. We have some of the greatest scientists in medicine; and *when we see that the saving of life has a commercial value*, as in the building of the

Panama Canal, we can save life and prevent disease as no other nation has ever done. But where life-saving does not show immediately in dollars and cents, there is no people more neglectful. . . . . .

"Here are some of the facts presented by the Southern health officer who visited Cuba. The capital of Cuba has a death-rate of 11. The capital of his State has a death-rate of 23.5, *more than double*. The Cubans spend 46 cents per capita on public health: his city spends 2 cents per capita on public health! I forbear to mention the name of the city, but there are others that are in as backward and disgraceful a condition. We as a nation should place just a little emphasis on the dollar, and a little more on life and health."

Control of Venereal Disease in New York City

Of vital importance is the recent action of the New York City Department of Health looking toward the reporting of cases of venereal disease. This matter has been under consideration for some time, and already in July last the Board of Estimate included an appropriation of $55,000 for a new venereal disease hospital to be erected on North Brother Island. Now, February 20, 1912, the Department has come forward with resolutions requiring the reporting of all such cases treated in public institutions (including those supported in whole or in part by voluntary contributions), and requesting the reporting by physicians of private cases. With regard to the latter cases the name of the individual need not be furnished, but unless the case is reported the Department will not make free diagnostic tests or supply curative sera.

The resolutions in full are as follows:

WHEREAS, The venereal diseases are infectious, communicable and preventable, and constitute a serious menace to the public health, thus properly coming under the charge of the public health authorities, and

WHEREAS, It is well established that no administrative control of such diseases is possible without a system of notification and registration, associated with provision for the municipal care of patients unable or unwilling to place themselves under proper medical care and to take the precautions necessary to prevent the infection of others,

BE IT THEREFORE

RESOLVED,

First, That on and after May 1, 1912, the superintendent or other officers in charge of all public institutions such as hospitals, dispensaries, clinics, homes, asylums, charitable and correctional institutions, including all institutions which are supported in whole or in part by voluntary contributions, be required to report promptly the name, sex, age, nationality, race, marital state and address of every patient under observation suffering from syphilis, in every stage, chancroid, or gonorrhœal affection of every kind (including gonorrhœal arthritis), stating the name, character, stage and duration of the infection, the date and source of contraction of the infection, if obtainable, and

Second, That all physicians be requested to furnish similar information concerning private patients under their care, excepting that the name and address of the patient need not be reported.

Third, That all information and all reports, in connection with persons suffering from these diseases, shall be regarded as absolutely confidential, and shall not be accessible by the public nor shall such records be deemed public records.

Fourth, That the Department of Health shall provide facilities for the free bacteriological examination of discharges for the diagnosis of gonorrheal infections, and also shall provide, without charge, vaccines for the treatment of such infections, and

Fifth, That the Department of Health shall undertake to make, without charge, the Wasserman and the Hoguchi tests for the diagnosis of syphilis and examine specimens for spirochetes.

Sixth, That these diagnostic and therapeutic facilities be extended only when the data required for the registration of the case be furnished by the physician treating the patient, and

Seventh, That the Department provide and distribute circulars of information in relation to these diseases.